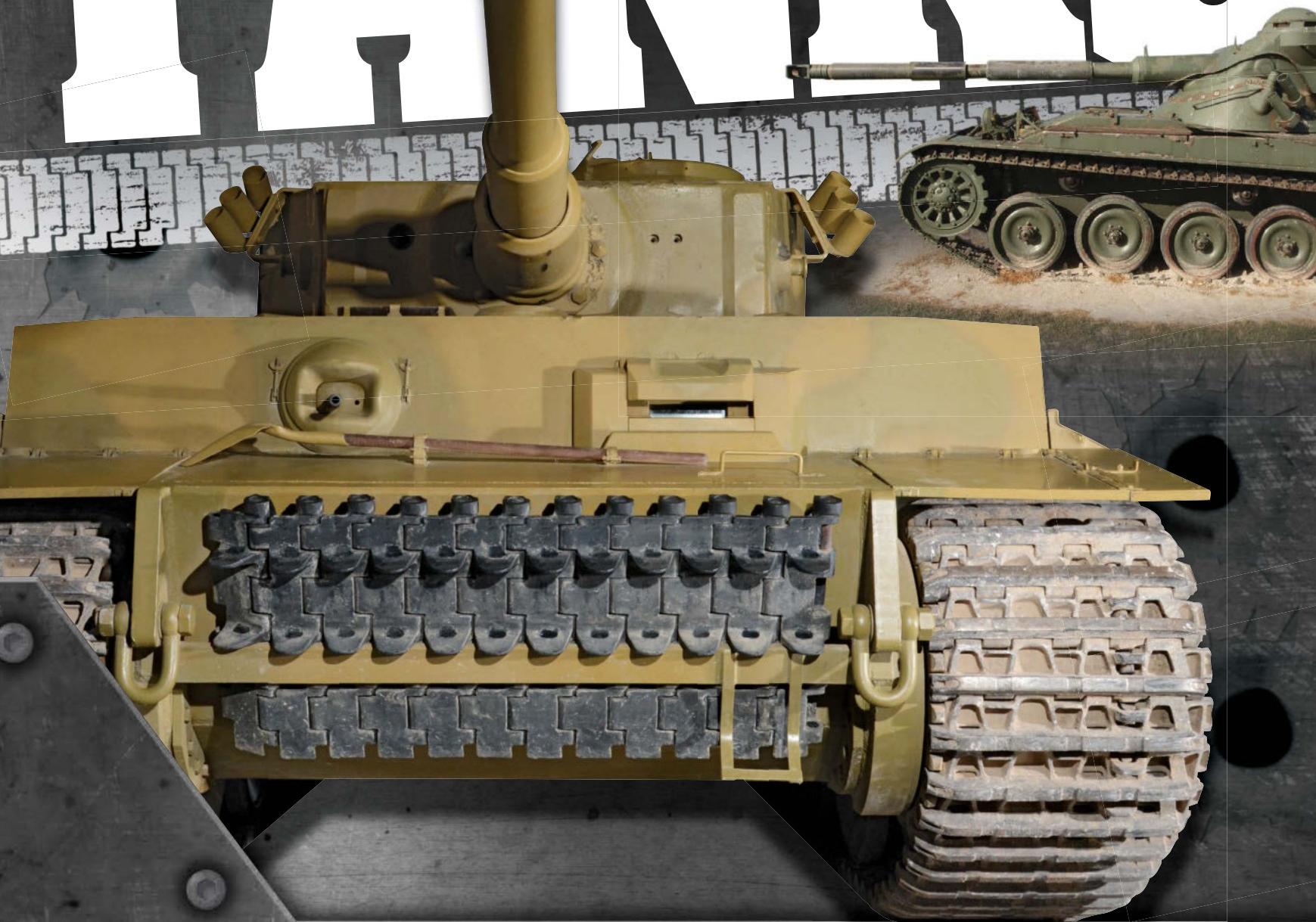


WARMACHINES: TANKS

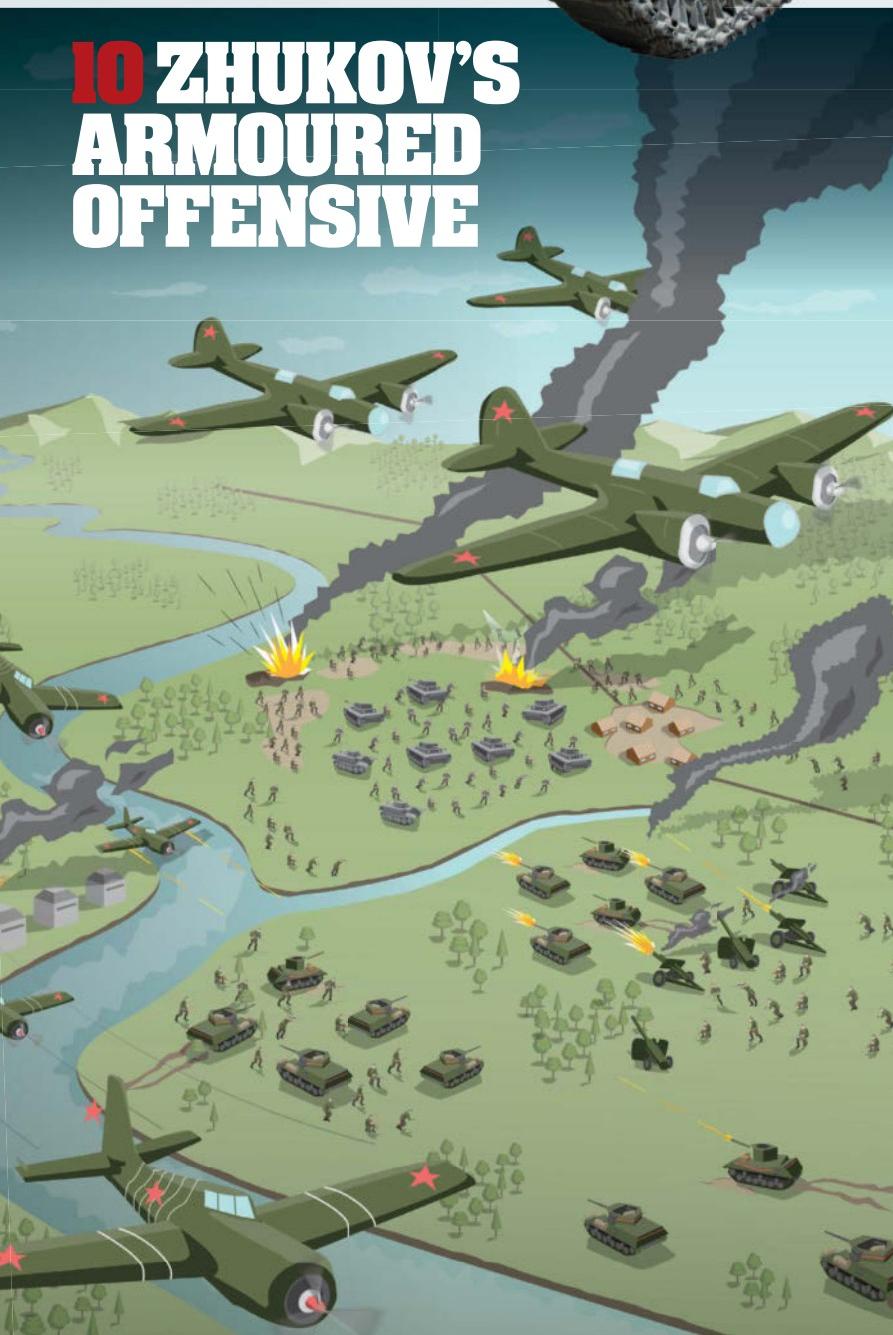


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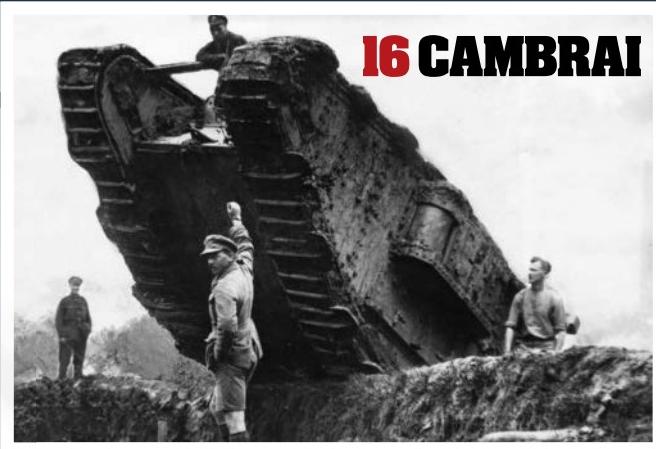
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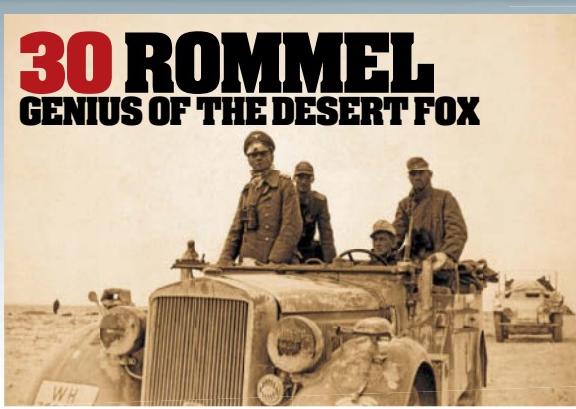
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LIGHT TANKS

Light tanks first saw action in WWI and demonstrated their versatility throughout the 20th Century, before arguably becoming obsolete

RENAULT FT

Founded: 1917

Country: France

Often cited as the world's first 'modern' tank, the Renault FT was a stalwart towards the end of the First World War, with over 3,000 of them produced during that time. Five or six could be made for the price of a larger tank, and they were built to swarm larger enemies and defeat them by sheer numbers.



T-26

Founded: 1931

Country: Soviet Union

The Soviet T-26 was heavily based on the Vickers Mark-E light tank operated by the British, and became an admirable model for rapid production. It's quite remarkable that over 10,000 of these machines were operational by 1939, cementing the Soviet Union's reputation as a military industrial powerhouse.



M3 STUART

Founded: 1940

Country: USA

The M3 is certainly one of the most well-known light tanks ever built, and was produced in large numbers by the US during the war. Many of these Stuarts would be leased to Commonwealth forces, and a large number of them saw action in North Africa against Rommel's fearsome Afrika Korps.



M551 SHERIDAN

Founded: 1966

Country: USA

Built to replace the heavy M41 Walker Bulldog, the Sheridan tank was used extensively during the Vietnam War as a reconnaissance and light infantry support vehicle. This was despite its weak hull armour and subsequent vulnerability when faced with RPG fire or AT mines.



TYPE 95 HA-GO

Founded: 1936

Country: Japan

Due to the demand for faster and more-reliable armour, the Japanese brought this light tank into production a few years before the outbreak of WWII. Its Hotchkiss-inspired cannon was built for dispensing with infantry, and two Type 97 LMGs completed the arsenal.



5 Facts about LIGHT TANKS

DROPPED ON PANAMA

The American M551 Sheridan was actually capable of being air-dropped from a cargo plane, with this being achieved for the first time during the US invasion of Panama.

EQUAL OPPORTUNITIES

The French Renault FT was available in both male and female varieties. The more common female carried a mounted machine gun, while the male sported a short-barrelled 37mm gun.

THE MAE WEST TANK

During the Thirties, American troops nicknamed some of the early dual-turreted light tanks 'Mae West', as an homage to the decidedly busty movie star of the time.

A STRANGE EXPERIMENT

In 1942, the Soviet Union tested, somewhat successfully, a flying light tank. The A-40 was attached to a pair of wings that allowed it to be towed in mid air and then released onto the battlefield.

THE RECORD-BREAKER

The British Scorpion Peacekeeper tank was recognised by Guinness World Records as the fastest tank ever created, achieving an incredible 51mph on a test track in 2002.



FV-101 SCORPION

Founded: 1972

Country: United Kingdom

Some Scorpions are believed to still be in use today around the world, with half of those produced being allocated for export. Only weighing eight tons, the Scorpion was an ideal vehicle for infantry support and reconnaissance, seeing action in the First Gulf War as well as the Falkland Islands conflict in 1982.



TYPE 62

Founded: 1962

Country: China

The Type 62 was built with manoeuvrability in mind, as well as economy. Due to its low cost it was adopted by certain African nations for use domestically, and the overall design was derived from the Soviet T-54. It first saw action in Vietnam after the Chinese provided several of the units to the NVA prior to the invasion of Kampuchea.

HEAD TO HEAD

War rages on the Eastern Front as the old Wehrmacht war horse, the Panzer I, goes up against the new kid on the block, the Soviet T-70

T-70 YEARS IN OPERATION: 1942-1948
LOYALTY: USSR NUMBER MADE: 8,200

FIREPOWER

Surprisingly heavy for a light tank, the T-70 had a 45mm gun that used both armour-piercing and explosive rounds. Its secondary weapon was a 7.622mm machine gun.

TACTICS

With a crew of two, the T-70 struggled to use its main turret effectively and became more of a reconnaissance vehicle. Its chassis would later be used for SU-76M tank killers and the T-80.

ARMOUR

Protection began at 35mm, but increased to 45mm in later models. The armour was reasonable, but wasn't enough to shield the T-70 from larger tanks and artillery on the battlefield.

SPEED

The T-70 had 140 horsepower at its disposal, which gave it a top speed of 45km/h (28mph). Light tanks had to be quick to compensate for their thin armour.

RANGE

A fuel capacity of 120 US Gallons gave the T-70 a range of 360km (224 miles) and helped it zoom across the Eastern Front, where it regularly supported the medium T-34 tank in battle.

LEGACY

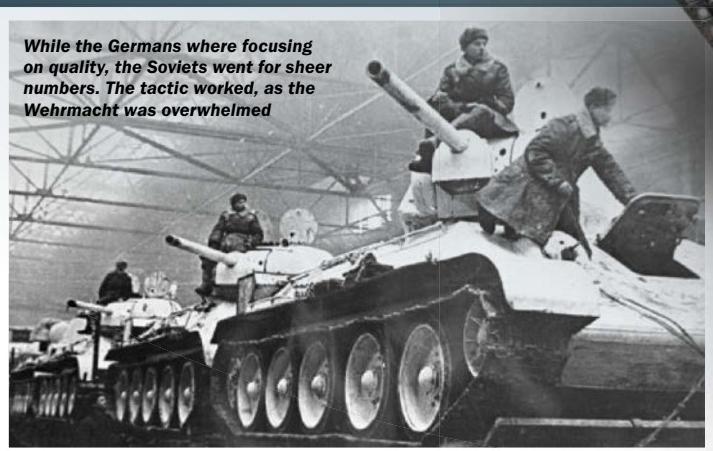
It may have been the most produced Soviet light tank of the war but the T-70 quickly became obsolete and was quickly changed to an anti-tank vehicle to suit its qualities.

TOTAL



SOVIET TANK PRODUCTION

Churning out T-70s like there was no tomorrow, the Soviet production line was bolstered by the decision to turn civilian factories into military production centres. The T-70 itself was often partnered with the T-34 on the battlefield as they fought the Germans at huge battles such as Kursk. Before the end of the war it was effectively replaced by the T-80, and its chassis was used on tank destroyers like the SU-76M and anti-aircraft guns such as the ZSU-37 as battlefield tactics and technology began to veer away from lighter tanks towards heavier, stronger models.



PANZER I

YEARS IN OPERATION: 1935-1945
LOYALTY: NAZI GERMANY **NUMBER MADE:** 2,800

FIREPOWER

The Panzer I lacked a main gun, instead employing two 7.92mm MG-13 machine guns that could fire 650 rounds per minute and had 2,250 rounds of ammunition.

TACTICS

The Panzer I was incredibly effective in the opening exchanges of the war as it stormed out of Germany as one of the main components of 'Blitzkrieg'.

ARMOUR

The steel plated armour of a Panzer I was some of the most primitive in the German armoured division, only a mere 12.5mm in thickness.

TOTAL



SPEED

Being an older tank, the Panzer could only muster 49km/h (25mph), but in the early days of the war that was more than enough to operate as an effective troop support.

RANGE

The Panzer could traverse 140 kilometres (87 miles) without filling up, which proved to be more than enough for rapid assaults of 'lightning war'.

LEGACY

Even though light tanks were superseded by heavier models in the Wehrmacht, the Panzer I was the starting point for German tank production and showed their intent on rearmament.



The German tank production line was efficient, but could not match the output of the allied powers

GERMAN TANK PRODUCTION

Throughout World War I, Germany had seemingly very little interest in tanks, but this changed dramatically in the vast rearmament of the Thirties. The first tank to appear on the Wehrmacht production line and breach Versailles was the Panzerkampfwagen I. The first of many, the model was used extensively on both the Western and Eastern Fronts and became a major element of blitzkrieg. As time wore on, the Third Reich changed their focus from light tanks to medium and heavy Panthers such as the Tiger and Panther, but the legacy of the Panzer I lived on.

The Panzer I was incredibly effective in the opening exchanges of the war as it stormed out of Germany as one of the main components of 'blitzkrieg'



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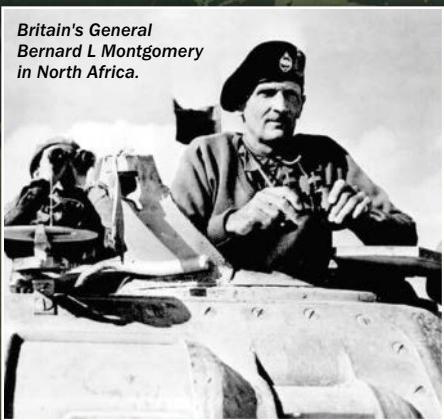
LIGHT TANKS OF THE WORLD

Stretching track marks across the globe and throughout the 20th Century

1 SIEGE OF TOBRUK

TOBRUK, LIBYA 10 APRIL 1941

Large numbers of light tanks from the British Commonwealth go into fierce battles with Rommel's armoured Afrika Korps to protect the Allied toehold in Egypt.



Britain's General
Bernard L. Montgomery
in North Africa.



Vickers 6-ton

Vickers 6-ton

Operating: 1929
Speciality: Long-range cross-country manoeuvres
Location: United Kingdom

T15

Operating: 1936
Speciality: High-speed off-road manoeuvres
Location: Belgium

Hotchkiss H35

Operating: 1935
Speciality: Engaging other light tanks
Location: France

Verdeja 1

Operating: 1940
Speciality: Infantry support and assault
Location: Spain

SK-105 Kürassier

Operating: 1967
Speciality: Anti-tank operations
Location: Austria

US LIGHT TANKS

M2 Light Tank

Operating: 1935

Speciality: Anti-infantry operations

M41 Walker Bulldog

Operating: 1953

Speciality: Scouting and infantry support

M22 Locust

Operating: 1942

Speciality: Airborne support and recon



TAM

Operating: 1976

Speciality: Infantry combat and wading
Location: Argentina

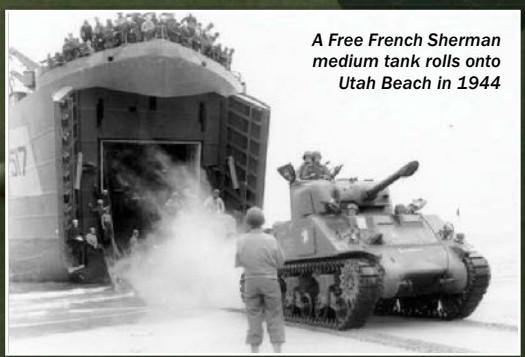


M22 Locust

2 D-DAY

NORMANDY, FRANCE 6 JUNE 1944

The Normandy landings of Operation Overlord required the Allies to deposit a large amount of armour onto French shores. Among these were British and American light tanks, along with the near ubiquitous Sherman.



A Free French Sherman medium tank rolls onto Utah Beach in 1944

3 FIRST BATTLE OF NAKTONG BULGE

SOUTH KOREA 6 AUGUST 1950

North Korea crosses the Nakdong River and into US-held South Korean territory. The Americans are on stand-by with M24 Chaffee light tanks, which saw service until after Vietnam.

RUSSIAN LIGHT TANKS

PT-76

Operating: 1951

Speciality: Recon and troop support

T-18

Operating: 1928

Speciality: Strength and firepower



Russian T-18

M1985

Operating: 1985

Speciality: Amphibious reconnaissance and assault

Location: North Korea

Type 63A

Operating: 1997

Speciality: Long-range amphibious assaults

Location: China



Type 63A

4 SECOND BATTLE OF EL ALAMEIN

EL ALAMEIN, EGYPT 23 OCTOBER 1942

German Panzer II tanks face off against a cohort of Crusader Mk I tanks of Great Britain as Monty goes head-to-head with Rommel.

The Soviet offensive at Kursk put the Germans on the back foot



5 BATTLE OF STALINGRAD

STALINGRAD, RUSSIA 2 FEBRUARY 1943

The German army surrenders at Stalingrad following a fierce counter-attack from the Soviet Union and its bevy of light tanks. Many cite this defeat as the turning point of the war on the Russian Front.



7 THE BURMA FRONT

BURMA 20 FEBRUARY 1942

The 7th Armoured Division, famously christened the Desert Rats, reaches Rangoon in Burma with light tanks and cruisers in order to set up defences in an attempt to halt the Japanese invasion of mainland Asia.

British Crusader tanks move into position in North Africa



6 BATTLE OF KURSK

KURSK, RUSSIA 5 JULY 1943

Georgiy Zhukov, springs his armoured trap on the Axis. American M3 tanks are utilised by the Soviet Union during some of the fiercest tank fighting ever known, although they prove unpopular.

8 SIX DAY WAR

SINAI PENINSULA, EGYPT

5 JUNE 1967

Israel and a conglomerate of Arab territories go toe to toe in the Six Day War, each utilising a host of different light tank designs including AMX-13s and Soviet PT-76s.

ZHUKOV'S ARMOURED OFFENSIVE

20 – 31 AUGUST 1939

Armed with over 450 superior light tanks, the Soviet armoured divisions settled a border dispute with the Japanese in Manchuria

The Second Sino-Japanese War was well underway by the time this small clash on the borders of Mongolia had developed into a full-scale conflict. Instigated after Mongolian cavalry entered Manchuria in May 1938, the conflict evolved into the battle of Khalkhin Gol between Imperial Japan and the USSR. The Soviets were able to call on small light cavalry 'Bystrokhodny' tanks such as the BT-5 and BT-7 ('Betkas'), which outpowered their Japanese equivalents. The fighting raged on throughout the summer of 1939 until the decisive blow on the 20 August, when Soviet General Georgy Konstantinovich Zhukov delivered a tactical masterclass.

"BT-5 TANKS ARMED WITH FLAMETHROWERS SMASHED THE JAPANESE FORWARD COMMAND POSTS AS THE RED ARMY SENSED BLOOD"

1 INITIAL SOVIET ADVANCE

Backed by air support, Zhukov's armoured divisions advance on to the eastern bank of the river Khalkin Gol ready to engage the Japanese with their superior BT-5 and BT-7 light tanks.

2 CROSSING THE RIVER

At its tributary, a 57,000-strong Soviet force, (including 498 BT-5 tanks) crosses the Khalkin Gol. This force included the 4th, 6th and 11th Tank Brigades and the 7th and 8th Mechanised Brigades.

3 START OF THE ASSAULT

The sheer number of Soviets shock the Japanese who have been let down by poor communications in their intelligence. They have a similar-sized force, but much inferior armour and technology as the artillery barrage begins.

4 A RELENTLESS OFFENSIVE

The joint Mongolian-Soviet attacks are unrelenting as the motorised divisions advance onwards, constantly reinforced by air support. The troops only move at night so the bombing raids mask the sound of caterpillar tracks. Defensive structures are constructed to fool the Japanese.



5 OUTFLANKING PINCER MOVEMENT

Unable to respond quickly, the Japanese units fall right into the hands of Zhukov, who pins down the centre of the Japanese line while using the BT-5 and BT-7 tanks on the flanks.

6 COMPLETELY SURROUNDED

The Soviet attack is a classic double envelopment. The Red Army first cuts around the right flank to the south and then the left to the north. They join up at the village of Nomonhan and the Japanese are surrounded.

7 SEEK AND DESTROY

BT-5 tanks armed with flamethrowers smash the Japanese forward command posts as the Red Army begins to sense its enemy is on the backfoot. The Japanese counter with Molotov cocktails, but the Soviets have covered their engines with wire mesh to limit the projectile's impact.

8 ATTEMPTS TO BREAK THE CIRCLE

Aware of their perilous situation, the Japanese infantry attempt to break out. The operation fails, as the Soviet motorised divisions are too strong and numerous.

9 DEFEAT BUT NO SURRENDER

Japanese martial tradition dictates that no soldier can surrender. This was the case at Khalkin Gol, where the remaining infantry were wiped out by airstrikes. Up to 40,000 Japanese troops died.

15 SEPTEMBER CEASEFIRE SIGNED

Humiliated at the loss, the Japanese turn their attention to naval supremacy, and in less than two years Pearl Harbor is attacked. The victory was essential for the USSR, who need experienced men come the German advance on the Eastern Front.

A HISTORY OF THE 'BETKA'

SPANISH CIVIL WAR

The USSR provided arms and aid to the left wing Republicans and Popular Front in Spain. By 1938, 50 BT-5 tanks were in Zaragoza to support the war effort.



THE WINTER WAR

Light BT tanks played a role in the Soviet invasion of Finland in 1939, and some were even captured by the Finnish and turned against their former masters.

BATTLE OF LAKE KHASAN

A precursor to Khalkin Gol, this battle would again see the BT-5 and BT-7 tanks outclass the Japanese Type 95 Ha-Go light tank.



BARBAROSSA

The light Betka tanks were obsolete by the time of the German invasion, as their armour and armament paled in comparison to the superior panzers.



TECHNICAL INFLUENCE

The Russian light tank series lived on as the BT tanks formed the basis for the mass-produced T-34 tank, which was used extensively on the Eastern Front and beyond.





**ANATOMY OF A...**

PANZER II

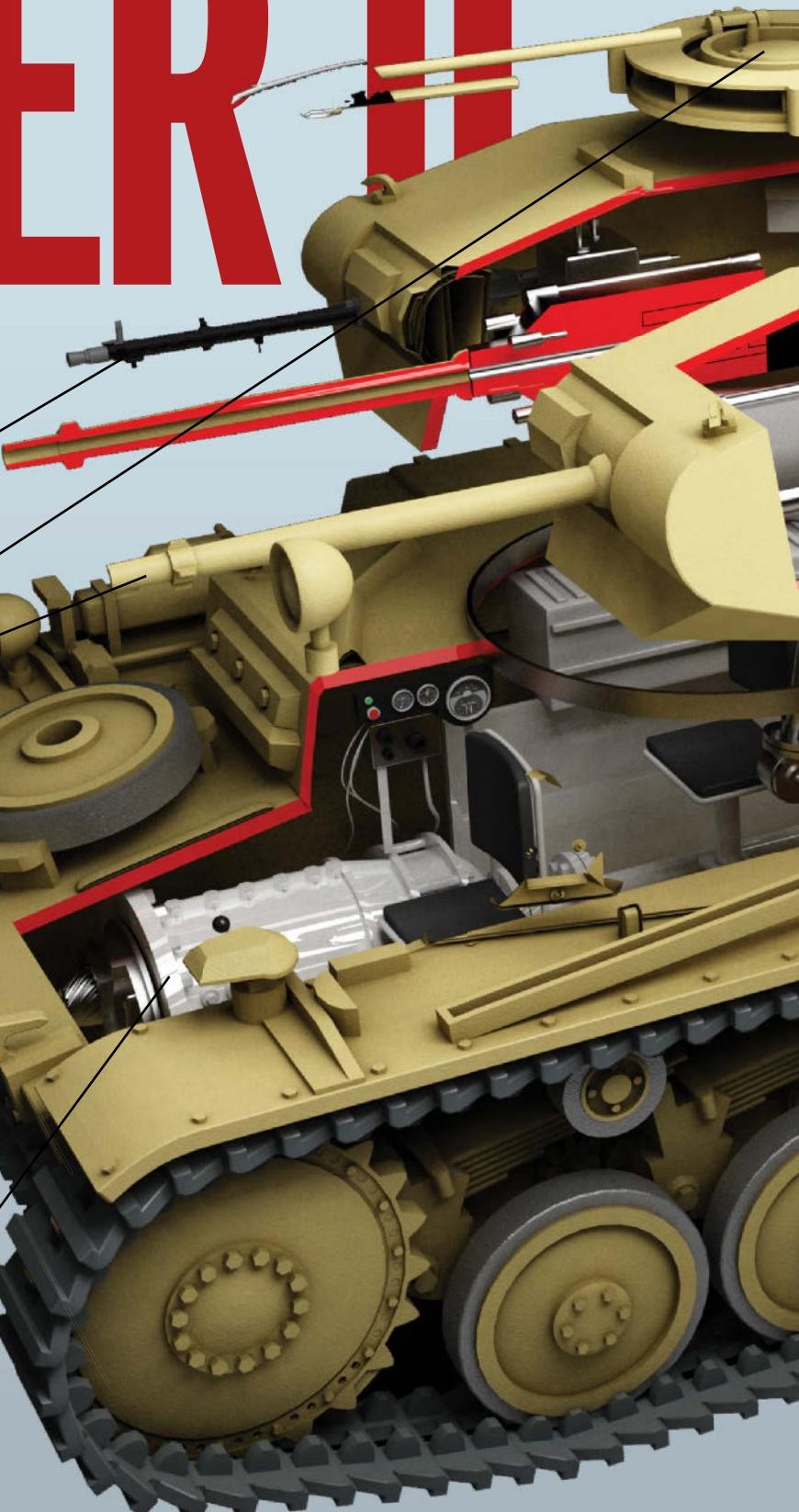
Developed clandestinely before the invasion of Poland, the Panzer II was phased out from 1942 though its chassis was used on a number of self-propelled guns until 1944

7.92MM COAXIAL MASCHINENGEWEHR

Also known by the designation MG 34, the 7.92 machine gun fitted to the Panzer II was an effective anti-infantry weapon and also saw service as a support weapon among Wehrmacht platoons.

20MM MAIN GUN

Produced in Germany in the mid-to-late Thirties, the 2cm KwK 30 L/55 was based on a 20mm flak cannon and was fully automatic, requiring the operator to fire in controlled bursts.

THE TRACKS**PANZERKAMPFWAGEN II****YEARS IN USE:** 9**COUNTRY OF ORIGIN:** GERMANY**ENGINE SIZE:** 6-CYLINDER, 138HP**CREW:** 3**LENGTH:** 4.81M**WEIGHT:** 8.9 TONS**TOP SPEED:** 25MPH**WEAPONS:** 1 X 20MM KWK 30 MAIN GUN,
1 X 7.92MM COAXIAL MACHINE GUN**THE FRONTAL GLACIS**

These only sported the standard amount of armour, which was strange for a tank, but later received a new single piece 30mm glacis upon reaching its final Ausf F designation.

MANUAL TRANSMISSION SYSTEM

The Panzer II sported a six-speed plus reverse manual gearbox made by ZF Friedrichshafen, which was generally considered to be reliable. Reversing was particularly handy for these little tanks.

HAND-CRANKED TURRET

The turret on the Panzer II was actually operated by the tank's commander rather than a specific gunner, as the limited space inside the machine only allowed for three crew members.

VISION PORTS

These were plentiful on the Panzer II, and absolutely essential in both offensive and defensive capacities. A Panzer II commander would operate the turret and so would need a secondary choice of viewport from his turret optics.

HOMOGENOUS STEEL ARMOUR

Early Panzer IIs came with only 14mm of armour on the front, sides and back. This was later increased to 30mm, and then to 35mm, but was still largely useless against anti-tank weaponry.

RADIO AERIAL**SIX-CYLINDER MAYBACH PETROL ENGINE**

The Maybach HL 45 was a six-cylinder petrol engine that saw service in several German vehicles during the Second World War. It was designed to provide the Panzer II with speed without sacrificing mobility.

TRACK RETURN ROLLERS

The upper part of the continuous track was supported by three return rollers, which were later increased to four on subsequent models of Panzer II for added stability.

RUBBER TIRED ROAD WHEELS

Five of these wheels helped propel the tracks, in turn propelling the vehicle forwards. Later models introduced a torsion bar suspension system for the wheels, whereas early models favoured leaf-type springs.

DESIGNED UNDER FALSE PRETENCE

With the end of the First World War came the Treaty of Versailles. Among many things limiting Germany were restrictions to her military rights, preventing her from producing armoured vehicles except for a few designated for security. To get around this, the German military ordered the Panzer II be produced under the designation Landwirtschaftlicher Schlepper 100, meaning that it was developed under the guise of being a farm tractor. This was common practice for Germany, and ensured that she wasn't in short supply of armour when war rolled around.





LIGHT TANK HEROES

The tactical prowess behind the formidable machines

THE DESERT RATS

Years active: 1938-1958

Country: Great Britain

The British 7th Armoured Division, colloquially known as the Desert Rats, was initially formed in Egypt to increase British strength in Africa and the Middle East following the Munich Agreement in 1938.

Set up as a mobile force, it was quickly developed into a division made up of a cavalry brigade supported by artillery cannons and howitzers, and was soon joined by the Royal Rifle Corps, which became a motorised battalion.

Following the outbreak of World War II, the Desert Rats regularly found themselves in combat with the Italian Army, which largely outnumbered the British contingent. However, due to the Italians' lack of armour and its reliance on outdated ordnance – including artillery that dated back to World War I – the Desert Rats were soon the dominant force.

However, it wasn't long before a more threatening enemy was close by. General Erwin Rommel, one of the finest tacticians of the

war, soon landed in Africa under orders from Hitler and brought with him his Afrika Korps. This led to a series of vicious and pivotal conflicts including battles at Tobruk and El Alamein, eventually resulting in the Axis retreat to Italy. The Desert Rats fought in Italy, before being recalled to Britain to aid in the Normandy landings of June 1944, now armed with heavier Cromwell tanks.

The courage and tactical mastery of the British 7th Armoured Division proved to be indispensable at a time when the German and Italian armies were in a strong position to increase their influence in Africa and the Middle East, and their gifted command of light tanks gave them the edge on tough, unforgiving terrain. The division's legacy lives on in name and tradition through the 7th Armoured Brigade, which still proudly sports the old rat insignia today. It's a small nod to the past that was very much earned by the boys of the 7th – after all, these are the brave men that chased the Germans all the way from Egypt to Berlin.

HEINZ GUDERIAN

Years active: 1907-1945

Country: Germany

Heinz Guderian's military legacy encompasses many things. One is his reputed temper and defiant nature, currying poor favour among senior German military officials. Another is the important part he played in developing German tank tactics – including Blitzkrieg manoeuvres – during both war and peace time.

The most important, though, is his easily identifiable loyalty to the military, characterised by his service to three different ideologies during his forces career, from empire to republic to dictatorship.

Guderian was one of only 4,000 officers asked to remain in the military following the signing of the Treaty of Versailles, and carried out his military service right through World War II, developing key tank tactics along the way and utilising light tanks to complement his emphasis on manoeuvrability.

A veritable military genius, Guderian's armoured tactics were the foundation upon which Panzer operations were built, and his defiance of Hitler at a crucial moment during Barbarossa reflected his astute nature.



Winston Churchill, accompanied by Field Marshal Sir Bernard Montgomery and Field Marshal Sir Alan Brooke, inspects tanks of 7th Armoured Division (the Desert Rats) in Berlin, 21 July 1945

STANISŁAW MACZEK

Years active: 1914-1947

Country: Poland

Defeat is a bitter pill to swallow. Some men succumb to it easily, others learn from it and adapt. Despite his efforts, Stanisław Maczek had to watch his besieged country fall into German hands in 1939, throwing the entire world into an inescapable state of violence, fear and uncertainty.

During Hitler's push into Poland, Maczek was ordered to move his 10th Motorised Cavalry Brigade into positions to defend the southern flank of the encircled Polish forces, only equipped with light tanks and smaller vehicles. He faced off against several Panzer squadrons, slowing the German attack considerably. Unfortunately, the Panzer divisions broke through, and it wasn't long before Poland fell into Axis hands.

Despite this, Maczek fought valiantly for the rest of the war, embodying the courageous and indomitable spirit of the Polish through the countless victories that he and his men achieved during the course of the war. Maczek passed away in 1994, aged 102.



MICHAEL WITTMANN

Years active: 1934-1944

Country: Germany

Often described as the most effective tank commander ever, Michael Wittmann began his military service as part of Germany's assault gun initiative in Berlin. Many of these mobile guns, such as the StuG, were based on the chassis of light and medium tanks like the Panzer II and III. At the outset of Operation Barbarossa, Wittmann's unit was ordered to advance into southern Russia, during which he was responsible for the destruction of a large number of Soviet tanks, earning himself the Iron Cross (Second Class) in the process.

In his ten-year military career, Wittmann was credited with well over 100 kills – an incredible total and one that justifies his

KURT KNISPTEL

Years active: 1940-1945

Country: Czechoslovakia (Sudeten German)

Even though Kurt Knispel didn't enter military service until 1940, and made his name in heavy Tiger and King Tiger tanks, his preceding years were spent completing tank training in the comparatively lithe Panzer I and Panzer II. This basis in armoured tactics proved indispensable throughout his career – one that ultimately resulted in Knispel becoming the highest-scoring tank ace of World War II.

At the time when Hitler made the fateful decision to invade the Soviet Union in 1941, Knispel manned the turret of a far heavier Panzer IV during the initial German assault into the seemingly unconquerable territory. Following this, he took command of Tiger tanks and their bigger brother, the fearsome Tiger II. During these years, Kurt Knispel earned 168 confirmed kills of enemy vehicles (although the number may be as high as 195!), cementing his position as a fearsome gunner, and a worthy commander to boot.



SYDNEY VALPY RADLEY-WALTERS

Years active: 1940-1974

Country: Canada

Nicknamed 'Rad', Sydney Radley-Walters developed a reputation as an effective military leader during World War II and a man that was popular among his men.

An officer with the 27th Armoured Regiment (The Sherbrooke Fusilier Regiment), Rad's strong interpersonal skills came to the fore in the aftermath of the D-Day landings of 1944, where their iconic Shermans, supported by M3 Stuart light tanks, found themselves face-to-face with the Waffen SS, caught in the hard slog that was Bernard Montgomery's misjudged Battle for Caen.

During the second half of 1944, Rad and the brave men of the Canadian Army faced off against Panzer divisions regularly, and there are many who claim that a Sherman Firefly under his command killed the famous Michael Wittmann. It was also the Sherbrooke Fusiliers that came to the rescue of the US 101st Airborne during the unsuccessful Operation Market Garden.



254TH INDIAN TANK BRIGADE

Years active: 1941-1945

Country: India

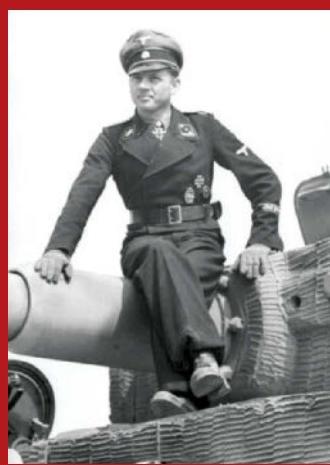
It was early 1942 when the Imperial Japanese Army invaded southern Burma and wasn't long before it had conquered the nation. Drafted in to intercept the invaders were the British, the Chinese, the US, Canada and a wealth of armies from the African continent. The British Indian Army played a crucial role in holding off the Japanese, and this particular brigade utilised M3 Stuart light tanks to outmanoeuvre and outgun the Imperial forces.

It was in 1944, when the Western Front

was preparing for Normandy, that the battle for Burma reached its climax. Japan's desire to take India thrust it into war, and two battles that took place simultaneously – and right next door to each other – resulted in the retreat of the Japanese forces. The 254th fought hard for months, cementing its reputation as an admirable armoured corps.



reputation. After the end of war in Europe, several groups and individuals attempted to take credit for the killing of Wittmann, after his Tiger tanks were destroyed by Allied forces in France.





Great Battles

CAMBRAI

When the British Army deployed tanks to change the pace of the First World War, it changed the face of it instead

WORDS JONATHAN HATFULL

By 1917 the British Army's notions of war had changed entirely. Any romantic ideals of the glory of combat and the open battlefield had been trampled and drowned in the blood-drenched, rain-slicked mud and barbed wire of the trenches of the Somme. Men fought and died for yards that felt like inches. Three years of almost imperceptible movement in the fields of France had pulled the wool from British commanders' eyes.

With change so desperately needed, it's not surprising that the plan of attack at Cambrai was the product of ideas from three groups. British preliminary bombardment meant German forces were always alerted to the fact an attack was imminent, enabling a tactical retreat before a counter-attack. In August 1917, artillery commander Brigadier General Henry Hugh Tudor proposed 'silent registration' of guns, bringing the artillery to the battlefield



CAMBRAI, FRANCE 20 NOVEMBER - 7 DECEMBER 1917

WHO

The British Third Army, including Commonwealth and American troops, up against the German Second Army.

WHAT

The first major tank battle of the First World War, seeing hundreds of British modified Mark IV tanks deployed.

WHERE

Cambrai, France. Part of the Hindenburg Line, it was heavily defended and a key supply station for German forces.

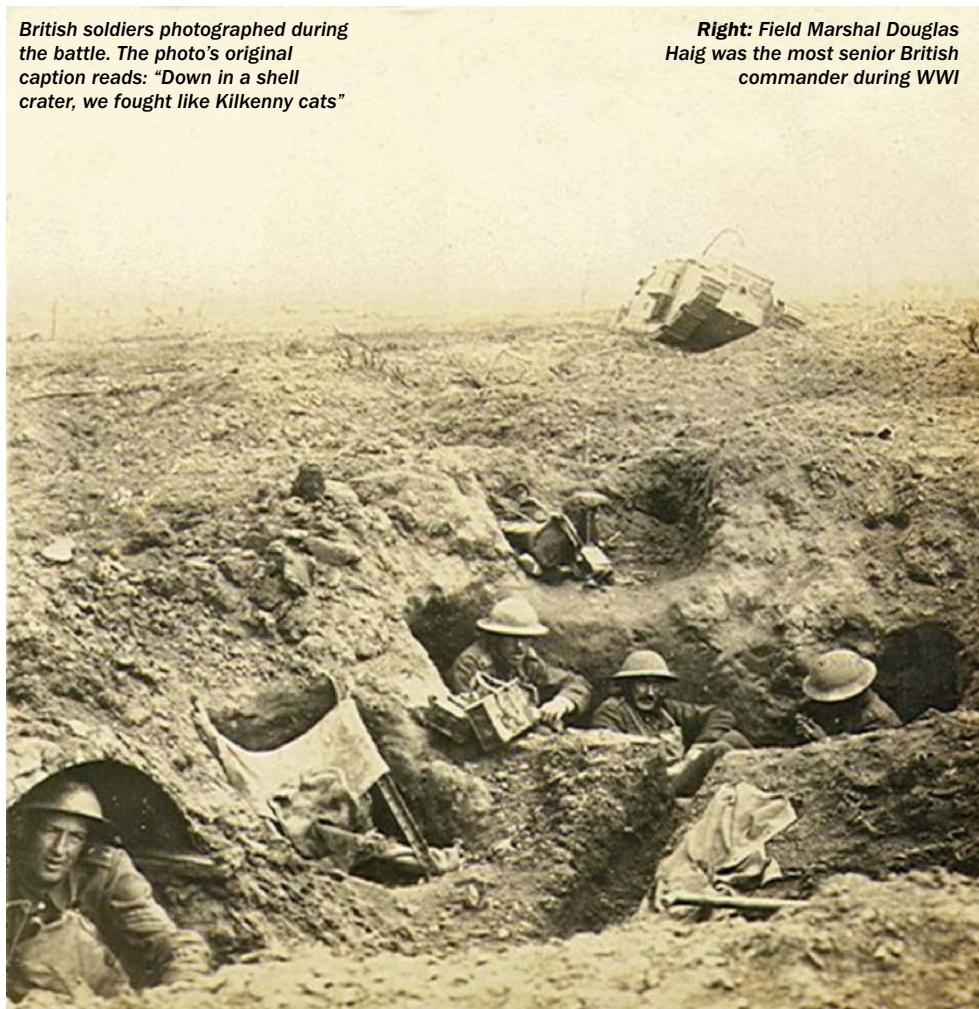
WHY

Attempting to break the cycle of trench warfare, the assault was meant as a 48-hour lightning attack to gain key positions.

OUTCOME

An important lesson in the co-operation between tanks and infantry, but one that came at a huge cost with very few tactical gains.

British soldiers photographed during the battle. The photo's original caption reads: "Down in a shell crater, we fought like Kilkenny cats"



Right: Field Marshal Douglas Haig was the most senior British commander during WWI



Below: General Julian Byng, commander of the British Third Army, pictured in April 1917



without alerting the enemy. This process would be greatly assisted by the use of the No.106 instantaneous fuses, which meant that shells would detonate immediately on impact.

Meanwhile, the Tank Corps' Brigadier General Hugh Elles and Lieutenant Colonel John Fuller were desperate for a chance to show their machines' worth. Fuller was convinced they would be capable of conducting lightning raids to smash resistance and drive the British line forward. This dovetailed neatly with Tudor's plan, as General Julian Byng, head of the Third Army, recognised. Byng turned his eye to Cambrai, a quiet area used by the Germans as supply point. While it was very well defended with the deep trenches of the Hindenburg Line and barbed wire, an attack would certainly be unexpected despite the area's strategic value.

With six infantry divisions, five cavalry divisions and nine tank battalions, more than 1,000 guns were mustered for the attack. There would be a front of around 10,000 yards, covered by the III and IV Corps of the Third Army, which would be widened as the attack progressed. The III Corps had to break the Masnières-Beaurevoir line, enabling the cavalry to circle around Cambrai and cut it off from

reinforcements before 48 hours had passed. Obviously, secrecy was paramount.

The Mark IV tanks were divided into "male" and "female" groups, with the former having four Lewis guns and two six-pounder Hotchkiss naval guns. The latter were each fitted with six Lewis guns. Without the naval guns, the "female" tanks were lighter, at 26 tons, while the "males" weighed 28. The crews also noticed that while the males had a door at the back, the female tanks had doors closer to the ground that were harder to get out of in an emergency. Eight men shared the single space with the engine, while the machine was only capable of reaching a speed of 3.7mph, and more typically around 1mph over bad terrain.

The tanks would lead, providing cover for the infantry as they crushed the barbed wire effortlessly under their tracks. As for navigating the trenches, each tank carried a fascine – a bundle of wood and branches, which would be deposited into the trench in order to fill it, so that the vehicle could drive over it. Meanwhile, a grapnel was fitted to some of the tanks to enable them to drag away the crumpled wire as they went, so that the path was clear for the advancing cavalry.

Several things needed to go very right in order for this so-called "clockwork" battle to work. Haig had fallen victim to overreaching in previous campaigns and he was determined that the Cambrai offensive have limited objectives and stick to its time frame. Minimising losses was crucial – even more so when he was forced to send two divisions to support the Italian front. Co-operation and communication between the divisions was also vital, as the battle's events would prove.

The battle rumbles to life

The attack began at 6.20am on 20 November as the artillery began shelling. With this stunning overture, the tanks advanced into the fog. The gentle incline made things very easy for the drivers, while the infantry marvelled at the ease with which the tanks rolled over the barbed wire as they followed them into battle, as did the men inside.

The initial advance seemed to be going impossibly well. The "clockwork battle" was living up to its name as the Germans were taken completely by surprise by this sudden, shocking attack. The British artillery kept up a devastating rate of fire, as much as possible given the two-rounds-per-minute rule to avoid overheating. The advance was also supported by the Royal Flying Corps, whose targets were on the ground rather than in the air. As the pilots braved machine-gun fire to drop their payloads, the weather worked against them. An Australian squadron pushed through

"WITH SIX INFANTRY DIVISIONS, FIVE CAVALRY DIVISIONS AND NINE TANK BATTALIONS, MORE THAN 1,000 GUNS WERE MUSTERED FOR THE ATTACK"

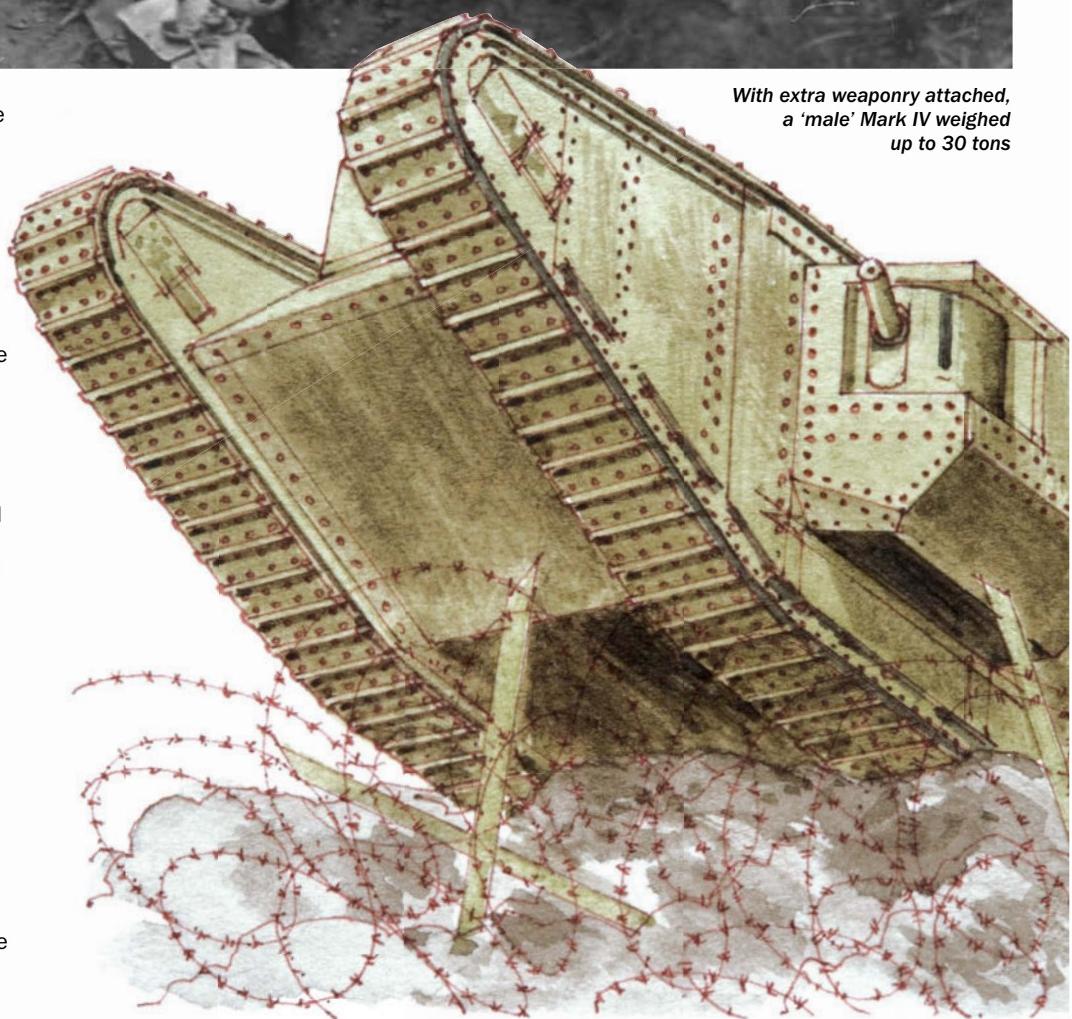


Men from the 11th Leicester Regiment in a captured enemy trench at Ribecourt

punishingly thick fog at Havrincourt, barely able to see one another, let alone their targets. If their planes went down, they had to fight their way back to their lines, as Lieutenant Harry Taylor was forced to do, picking up the weapon of a fallen man and setting out to find support.

This isn't to say there was no resistance. A myth sprung up as the days went on about a German gunner who held the enemy at bay entirely by himself. That myth does a disservice to the determination and skill of the men who suddenly found themselves on the back foot. Some of the troops stationed near Cambrai had come from the Russian front and had never seen a tank before. It's impossible to know what these soldiers thought as the metal leviathans rolled towards them, but they fell back on their training, resisting where possible before making a tactical retreat.

Before long, communication began to prove an issue. When the tanks worked in tandem with the infantry, such as through Havrincourt and Graincourt, things went very smoothly. Elsewhere, infantrymen were forced to bang on the door of the tanks to get their attention, while confusion over objectives led to groups of infantry being forced to take key positions without artillery support. However, sitting in these slow-moving targets had its own terrors. They drew the bulk of enemy fire and if the engine gave out, whether due to attack, water in the fuel tank, or even a fire, the tank became a sitting duck. Once engaged in combat, the inside of the tank would become incredibly



With extra weaponry attached, a 'male' Mark IV weighed up to 30 tons

hot as the guns began to fire and the sound of their doing so was deafening. Visibility was shockingly poor, while the fact that most tanks had to stop in order to turn meant that they were a popular target on the battlefield.

Nevertheless, the speed with which they were taking ground was intoxicating; each trench taken and each line of wire cleared was another step towards the objective and morale had rarely been higher. As the tanks moved further away from their lines of reinforcement, establishing a clear road and lines of communication back became crucial. However, the supply mules proved nearly useless in the tangle of mud and wire, while the narrow roads quickly became clogged with traffic back and forth, ferrying wounded and prisoners.

The Third Army consolidates

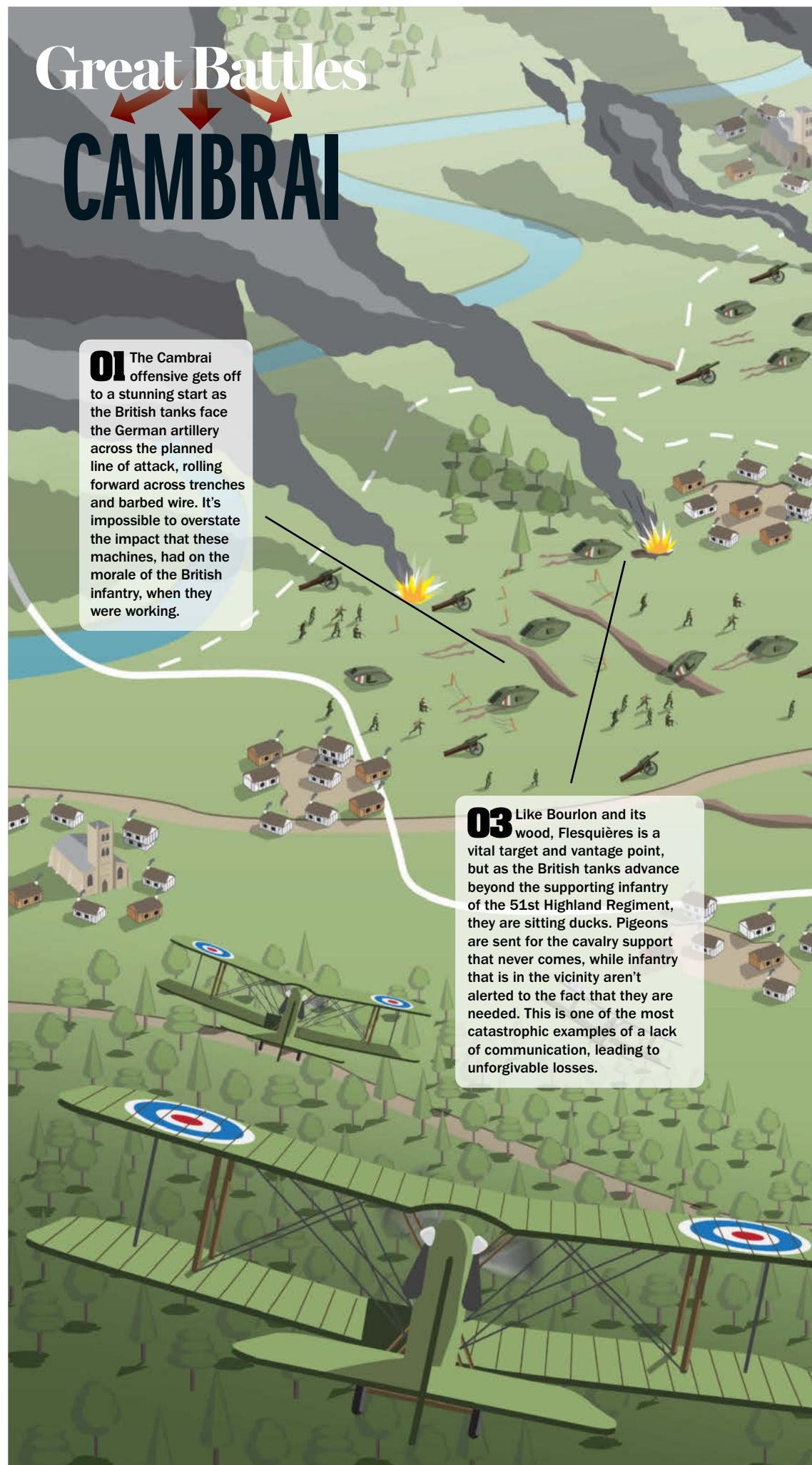
Despite the ground gained, the first day ended with some major concerns. While crossing trenches had proved easy enough for the tanks, moving past the St Quentin Canal was another matter indeed. A crucial bridge at Masnières had been crushed by a tank that had attempted to cross the canal, stopping the planned infantry advance, while another had been mined. The cavalry was delayed by the clogged roads, while a lack of communication frequently meant they were stranded or forced to retreat. A lone squadron of Canadian cavalry realised it was the only unit to make it across the canal at Masnières and was forced to find its way back around and across.

Meanwhile, the key village of Flesquières had not been captured after the advancing tank divisions became separated from the infantry of the 51st (Highland) Division. With no infantry support, the tanks were target practice for the gunners at Flesquières ridge and suffered huge losses. Messengers from the battlefield, some of whom walked the two miles on foot, struggled to convince their commanders that Flesquières had not yet been captured. Crucially, Major General George Montague Harper refused to commit any of the troops held in reserve to take the objective.

The second day required consolidation and advancement. Masnières was taken in the

OPPOSING FORCES

BRITISH LEADERS	GERMANS LEADERS
Field Marshal Douglas Haig,	General Georg von der Marwitz, Crown Prince Rupprecht of Bavaria
General Julian Byng	
INFANTRY	INFANTRY
2 Corps (6 divisions)	1 Corps
CAVALRY	PLANES
5 divisions	Baron Manfred von Richthofen's Jagdgeschwader 1 (approx. 40 planes)
TANKS	GAME CHANGERS
476 (378 fighting tanks)	The air force led by Baron Von Richthofen that arrived on the 23 November to combat the RFC and attack the British ground forces.
PLANES	
14 squadrons	
RESERVES	
4 divisions	
GAME CHANGERS	
378 fighting tanks that enabled the British to move forward at an incredible rate on the first day of fighting.	







morning, but as a salient it was open to a punishing amount of shell and machine-gun fire, and the German air force soon reappeared to make life very difficult for the British troops. Meanwhile, the tanks had used all their improvised wooden fascine bridges on the first day, which made crossing the trenches difficult, and the infantry were reluctant to advance without them.

Things looked much better for the IV Corps, which advanced on Flesquieres dreading the prospect of a prepared German resistance, only to find it had been abandoned. In contrast, while the cavalry helped take Cantaing, it struggled to work in tandem with the tanks as planned. Similarly, as the tanks moved into villages, it became clear they were not prepared for street fighting. With no machine gun on the top of the tank (it would be introduced in 1918), they were horribly vulnerable to fire from second-storey windows. Still, Fontaine was secured despite heavy losses, leaving Bourlon and its dense wood as the next target.

The offensive was on a knife edge without enough men to consolidate these gains. Fontaine was incredibly vulnerable, but was refused any artillery support and destroyed bridges made moving supplies incredibly difficult. Meanwhile, the German vantage points

"RUNNING FROM TREE TO TREE, WITH THE NOISE OF CEASELESS GUN FIRE, A HUGE NUMBER OF SOLDIERS WERE LOST"

of Bourlon and Bourlon Wood posed a serious threat to the British. After a last-ditch effort ordered by Byng to push through, the order came to halt and dig in.

When Haig learned of the attack's successes and failures, he decided to junk the 48-hour time limit and continue the advance. He toured the battlefield, congratulating the men and helping to spread the myth of the lone German gunner at the Flesquieres ridge, as that was surely a better explanation for the number of ruined British machines on the battlefield than the alternative. During this apparent lull on 22 November, German forces rushed Fontaine and retook it. Resistance was growing, and as the British dug in for the night in the miserable November cold they knew that their momentum was slipping away. Haig stressed to Byng that Bourlon and Fontaine must be captured by the end of 23 November.

Bitter fighting at Bourlon Wood

The fresh offensive was major, with 400 guns and 92 tanks, while the 40th Bantam

Division was dispatched to relieve some of the exhausted men at the front. The tanks met fierce resistance in Fontaine, and were forced to withdraw to the disapproval of Tanks Corps intelligence officer Captain Elliot Hotblack, who saw the effect their retreat had on the infantry's morale. Further down the line, German infantry made life hell for the tanks, finding the machine gunners' blind spots and throwing hand grenades inside, leaving the British soldiers trapped and burning.

Having reached Bourlon Wood with the help of the tanks, fighting through the thick wood was now the infantry's job alone. It was here that some of the most-intense and gruesome combat was seen. Running from tree to tree, with an unimaginable noise of ceaseless gun and artillery fire, a huge number of British soldiers were lost in Bourlon Wood.

When the German forces were finally pushed out, they started shelling it. Meanwhile, both Bourlon and Fontaine remained in German hands despite attempts in the afternoon, but the casualties on both sides were horrific. As



Above: Tommies look on as British artillery arrives at Cambrai in December, 1917

Left: German officers pose with a captured British tank in Cambrai. Hundreds of stranded or abandoned British machines were captured during the offensive

Right: Manfred von Richthofen, known as 'The Red Baron', played a pivotal role from the air at Cambrai



night fell, troops were sent to support the men in Bourlon Wood as counter attacks from the Germans continued well into the night. Haig told Byng that Bourlon ridge simply must be taken, so the Guard division was summoned to support and relieve the depleted forces.

Throughout 24 November, shelling and counterattacks continued on Bourlon Wood. Poor weather made it difficult for any RFC pilots to take to the skies and challenge the forces of the recently arrived Manfred von Richthofen, the Red Baron, whose planes rained fire on the wood. German efforts to grind down the soldiers in the wood continued throughout the day. Counterattack met counterattack, and 25 November saw further terrible lapses in communication and bloody skirmishes. Battalions without tank support were mown down by machine-gun fire at Bourlon, while an entire cavalry regiment ordered to wait within sight of the German artillery was shelled. A furious Haig ordered the capture of Bourlon and Fontaine by the 27 November, as German forces continued to push at the exhausted British throughout the night.

A planned attack on 26 November was the cause of fierce argument between Major General Braithwaite, who bemoaned the lack of support and fresh troops, and Byng, who

had his instructions from Haig. The attack went ahead, as Fontaine was taken at tremendous cost and targets in Bourlon Wood were reached. However, there was barely time to note the achievements before counterattacks drove the British forces back.

The German offensive

While skirmishes wore both sides down, the time had come for the major German counter-offensive after reinforcements had been arriving since the second day of the attack. Planned by Crown Prince Rupprecht of Bavaria, and widened by his superior General Erich Ludendorff, it was the first offensive planned against the British since 1915. Gas was fired into the wood two days before the attack, and at 6am on 30 November the assault began. Despite the warnings of some key officers, the British troops were simply not prepared for the assault at Gouzeaucourt, as German soldiers swarmed the British line and amassed prisoners. This was the first instance of the German stormtroop tactics, as the first wave of soldiers went around targets and cut them off as the further troops arrived.

As British soldiers realised what was happening, across all their lines, attempts were made to regroup and stand their ground as startled officers threw down their shaving kits

and looked for their weapons. While German forces broke through in some places and were held up in others, communication broke down once again. There was simply no plan in place for this kind of counterattack, meaning that any attempts to fight back and reclaim ground were made on the hoof.

Much as the Germans had offered fierce resistance, so too now did the British. At Les Rues Vertes, the inspired and determined defensive tactics of Captain Robert Gee meant that their position and the brigade's ammunition dumps were held. He set up a Lewis gun, organised bombing raids against the attackers, killed two Germans who had infiltrated his position and killed the guards, before charging a German machine-gun post with his two pistols. While seeking medical attention he was forced to jump into a canal and swim to safety. His actions earned him the Victoria Cross.

As reinforcements arrived, the Guards Brigade retook Gouzeaucourt, while the forces in Bourlon Wood held determinedly to their positions. The conflict turned into a series of costly but unproductive skirmishes. As the days passed and the casualties mounted, Haig finally realised the necessity to fall back and form a line for the winter. He ordered a retreat on 3 December and by 7 December the lines had settled, with both sides having made considerable gains and losses in territory.

The British casualties numbered 44,207 killed, wounded or missing. The number of German losses has proved harder to calculate, with estimates ranging between 41,000 and 53,300. The battle has proven to be one of the most fertile grounds for myths of the First World War to form, but what is clear is that crucial lessons were learned in how important communication and co-operation between different divisions was.

A lack of support in reserve, a lack of communication, and that terrible desire to overreach led to the attack's failure. While it may have been the first large-scale tank offensive in the war, this landmark came at a terrible cost to both sides.

War Machines

TIGER I

One of the most advanced Axis panzers of the Second World War, the Tiger I struck fear into the hearts of Allied tank divisions

Between August 1942 and the fall of the Third Reich, approximately 1,500 Panzerkampfwagen VI Tiger Ausf.E were manufactured by the Nazi war machine.

Renowned for its accuracy and strong armour, this heavy tank was a formidable foe to the Allied forces. It outclassed many of the Sherman tank models in several departments and tales told from the war have described 75mm rounds bouncing straight off the Tiger's solid armour.

The tank saw its first action in September 1942 as the Third Reich advanced eastwards under Operation Barbarossa. In an engagement near Leningrad, four Tigers managed to dispatch 24 Soviet T-34 tanks. In fact, the Tiger only floundered when it became stuck in the harsh conditions



PANZERKAMPFWAGEN VI TIGER AUS.F.E

COMMISSIONED August 1942

ORIGIN Kassel, Germany

LENGTH 8.45m (27.7ft)

RANGE 5,000m (16,404ft)

ARMOUR Electro-welded interlocking nickel-steel plates

ENGINE Maybach HL 210 P45

PRIMARY WEAPON 88mm cannon

SECONDARY WEAPONS 7.92mm MG-34 machine guns

CREW 5

the Russian winter, where its caterpillar tracks would become trapped in the dense, frozen mud of Eastern Europe. This meant the nimble T-34 could now outmanoeuvre the Tiger and strike where the armour was weakest. The Allies had no answer to the sheer power of Panzerkampfwagen VIs until the development of the Sherman Firefly in 1943, which finally matched Tigers pound for pound. Before this, only wave after wave of Shermans and T-34s could bring about the downfall of a Tiger.

By 1944, German factories had hurried the Tiger II into production and the numbers of the Tiger I dwindled. Contemporary reports suggest that the Tiger I was over-engineered and, towards

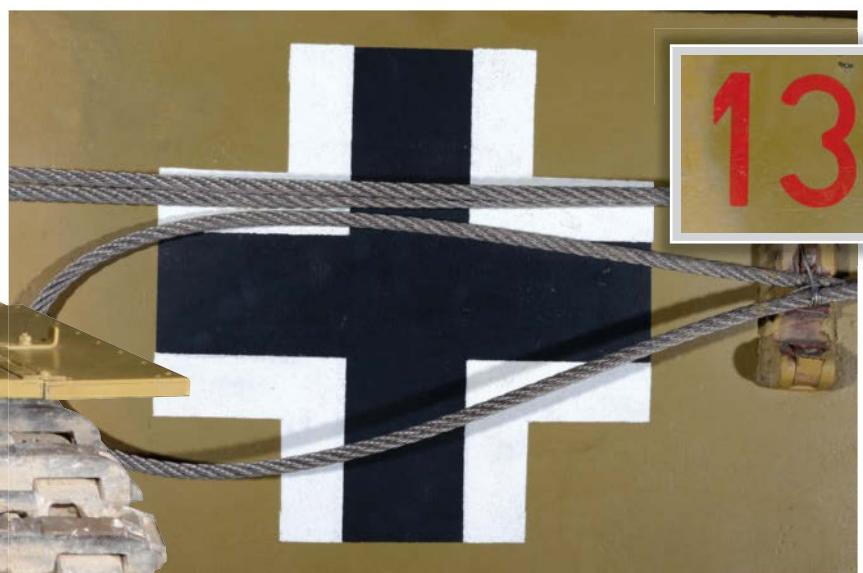
the latter stages of its lifespan, rushed off the production line as the Nazis desperately tried to save the war.



A Tiger I tank rolling across the battlefields of Europe was a frightening sight for any Allied soldier

Bundesarchiv, Bild 101I-299-1805-16 / Scheck / CC-BY-SA

"THE ALLIES HAD NO ANSWER TO THE SHEER POWER OF PANZERKAMPFWAGEN VIS UNTIL THE DEVELOPMENT OF THE SHERMAN FIREFLY"



Above The tank has insignia showing its battalion and allegiance to the German Wehrmacht. This particular model was found abandoned in the North African desert

Right The Tiger I was reliable mechanically but was let down by over-engineering and the harsh conditions of the Eastern Front



Bundesarchiv, Bild 101I-022-2936-27 / Altvater / CC-BY-SA

88MM GUN

The main weapon of the Tiger could shatter the defences of Allied tanks and fortifications. The 88mm gun could penetrate 100mm of armour from up to 1,000 metres (3,280 feet) away. On the battlefield, the Tiger would be strategically placed on hilltops to make use of its cannon's long range while being protected from enemy fire by its thick armour.



The huge 88mm Panzergranaate 39 gun dwarfed the allied M4 Sherman cannon and was originally an anti-aircraft gun



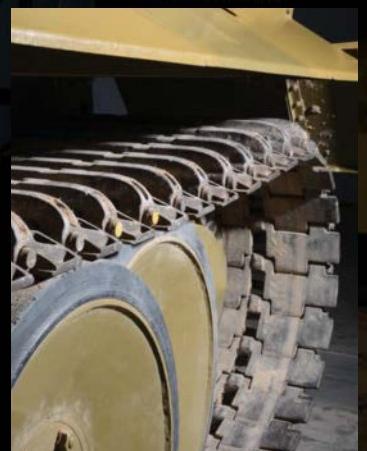
Above The panzer's ammunition varied from armour-piercing shots to high explosive and incendiary rounds

Bundesarchiv, Bild 183-J14931 / Rottensteiner / CC-BY-SA.jpg



CATERPILLAR TRACKS

The tracks fitted on a Tiger were extremely wide. This helped the bulky 57-ton tank traverse over boggy ground as well as spreading the weight more thinly to cross bridges. Despite this, the Tiger was the victim of adverse weather conditions on the Eastern Front as frozen mud wedged itself within the tracks. The lightweight soviet T-34s didn't experience this problem as frequently and were able to outflank the Nazi tanks – particularly at the 1943 Battle of Kursk, which was the biggest tank battle of all time.



SECONDARY WEAPONS AND AMMUNITION (TWO 7.92 MG-34 MACHINE GUNS)

As well as its main cannon, the Tiger was fitted with MG-34 or MG-42 machine guns. A Tiger tank would have one next to the driver at the front of the tank and on some models an MG would be attached to the top of the vehicle. These machine guns could reach distances of up to 400m (1,312ft) and 5,850 rounds would be kept aboard to cut down swathes of infantry and light vehicles.



THE TIGER II

THE TIGER WASN'T THE MOST FEARSOME OF THE NAZI PANZERS. THE TIGER II WAS BIGGER, STRONGER AND BETTER PROTECTED

MAIN GUN

The Tiger II's main gun packed a marginally more powerful punch than the Tiger I as it could penetrate 182mm (seven inches) of armour at double the distance. This was also further than Allied tanks of the period. Known informally as the Königstiger, only 492 of these mighty machines were made.



ARMOUR

The armour was nearly 200mm thick on the Tiger II, and significantly more than its predecessor. The Allies tried to create equivalents but tanks such as the American T29 were not ready for World War Two. The Tiger IIs were rushed into production and were often hampered by ill-suited engines.



KING-SIZE

The Tiger II was a heavy tank and its bulk was even larger than the Tiger I. The original Tiger already had issues with its engine so the larger size of the Tiger II emphasised these problems even more. Only in use at the tail end of the war, we will never know how it could have contributed to the earlier stages of the war.



INTERIOR

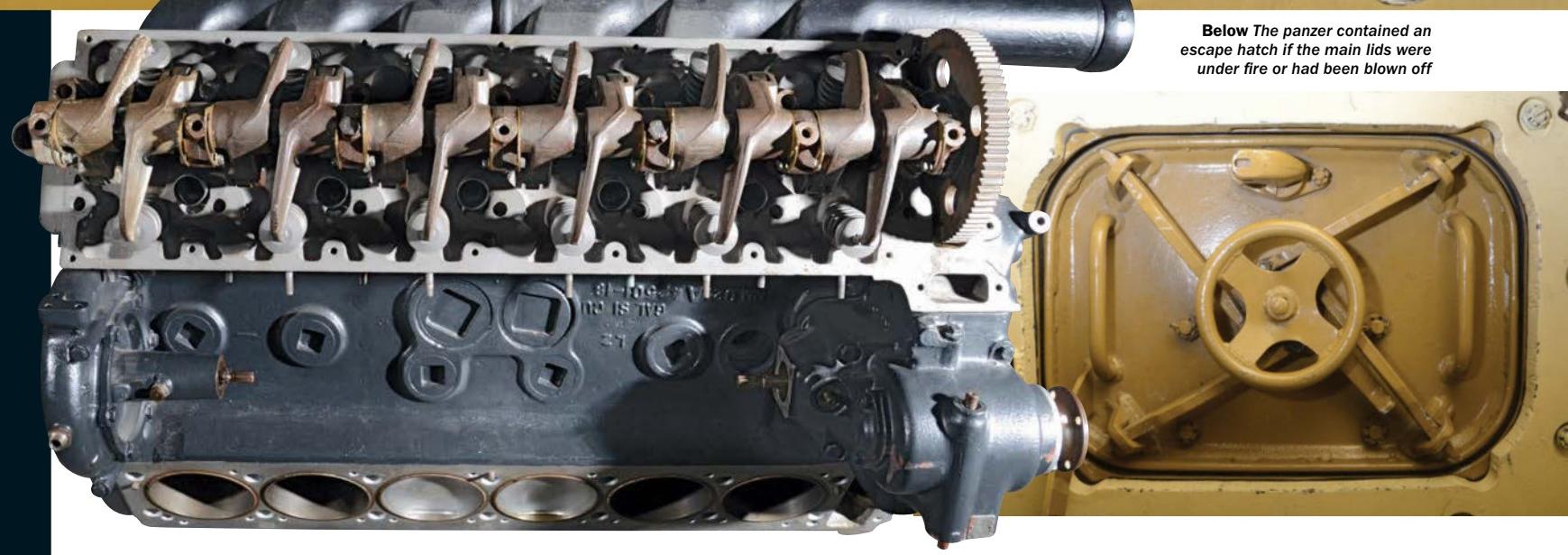
The Tiger's small enclosed interior contained a crew of five: a gunner, loader, driver, commander and a radio operator. Although small, the Tigers were over-engineered by their manufacturers, so the interior was packed with modern sighting equipment, weapons caches and tools. The drivetrain was aided by hydraulic-power-assisted steering and the entire mechanism was powered by four batteries. The whole tank was so advanced that when it was captured by the British, it was inspected by Winston Churchill and George VI and then taken back to Britain for extensive testing.

Despite its large exterior, the inside of a Tiger was a cramped place where fires were a frequent problem



Below The Germans insisted on using a 641bhp (478kW) 21 litre petrol Maybach HL210 engine in their Tiger I tank

Below The panzer contained an escape hatch if the main lids were under fire or had been blown off





The Tiger had a complex exhaust system on its rear to increase power

THE TIGER 131

This Tiger model was part of the 504 Schwere Panzer Battalion in North Africa and was one of the very few not to have been destroyed by its own crew. Forensics and analysis have shown that the Tiger was hit several times by British Churchill tanks but none disabled the tank. The main damage was dealt just underneath the barrel and wedged the turret to the hull. This stopped it from working, but could easily have been repaired by the crew. This makes it even stranger that the crew abandoned it and didn't destroy it as they were instructed to. It's the only working Tiger currently in existence and was featured in the 2014 film *Fury*.

Below The well-engineered Tiger was a box of tricks and had cables and even a spade to help retrieve it from sticky situations



THE TANK MUSEUM

Situated in the Bovington Army Camp in Dorset, The Tank Museum was opened in 1947. It contains over 300 vehicles from 26 different countries, from the First World War Mark I tank to the currently serving Challenger 2. Tiger 131 was given to the museum in 1951 and is one of the most popular tanks in the entire museum. There is now a 'Tiger Day' every spring, which explores the history of the tank, as well as its many contemporaries from the Second World War. Visit www.tankmuseum.org for opening hours, admission information and more!

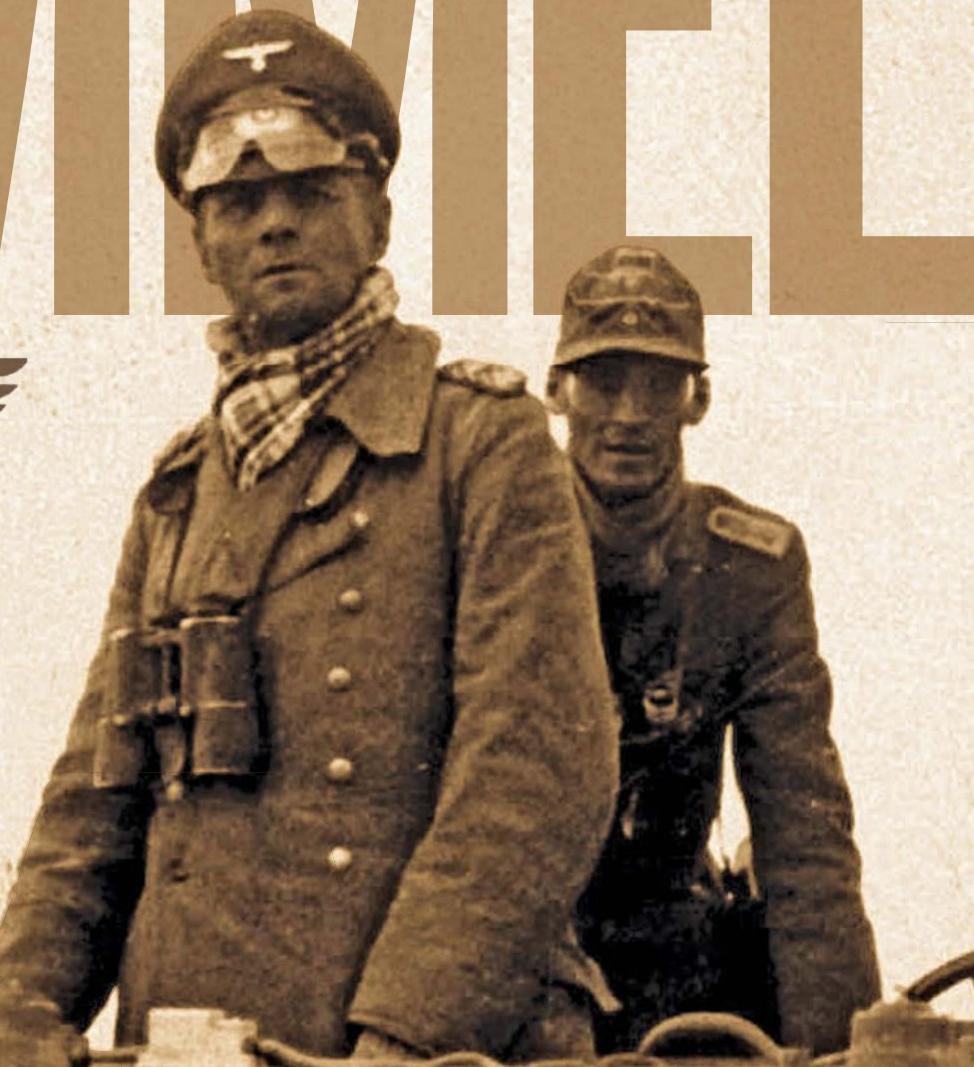


ROMMEL



GENIUS OF THE
**DESERT
FOX**

WORDS MATTHEW MOSS



The tragic story of Nazi Germany's most famous general, whose genius and audacity led him to be revered by both friend and foe



The legend of Erwin Johannes Eugen Rommel has been firmly entrenched in Western history for over 60 years. Unquestionably Hitler's most-famous general, at the heart of his myth lies a remarkable man; driven, brilliant and supremely skilled, yet also flawed. Rommel could be brash, volatile and arrogant, and suffered from bouts of depression. At the peak of his career in January 1942, Winston Churchill described him as "a very daring and skilful opponent... a great general." In addition to being a great tank commander, Rommel was a brilliant tactician and exceptional leader, as well as a loving father and doting husband.

He commanded the devotion of his men and the respect of his enemies, becoming a legend in northern France and the deserts of North Africa. Using his trademark cunning and audacity, he beat the odds stacked against him on the battlefield, only meeting his downfall when he became embroiled in a world of politics he little cared for, and didn't fully grasp.

Born in 1891 in southern Germany, Rommel joined the army at 18. Ironically, the man who would prove to be one of modern warfare's

greatest commanders was rejected twice before joining the infantry in 1910. He became a career officer, serving throughout the First World War, and was decorated with the Pour le Mérite, Germany's equivalent of the Victoria Cross. During the interwar years he became an instructor, training officers in the aggressive infantry tactics he'd developed during the war. With the rise of the Nazi Party, Germany again turned to her military, and Rommel found himself commanding the bodyguard of Germany's new Chancellor, Adolf Hitler.

The Invasion of France

On 1 August 1939, Rommel was promoted to Major General, commanding Hitler's headquarters during the coming invasion of Poland. Just a month later, at 4.50am on the morning of 1 September, German forces crossed the Polish border.

In charge of the security for Hitler's headquarters, Rommel was in a position to learn all he could of Germany's new way of war – Blitzkrieg. He found this tactic completely in step with his own decisive and energetic style of fighting. The general enjoyed an increasingly close relationship with the Führer, lunching with him and being invited to attend briefings. Writing home excitedly to his wife Lucie, he exclaimed: "I was able to talk with him for

"HE COMMANDED THE DEVOTION OF HIS MEN AND THE RESPECT OF HIS ENEMIES, BECOMING A LEGEND IN NORTHERN FRANCE AND THE DESERTS OF NORTH AFRICA"

"THE GROWING ADMIRATION BETWEEN THE TWO ENCOURAGED ROMMEL TO ASK HITLER FOR WHAT HE REALLY LONGED FOR – COMMAND OF ONE OF THE NEW PANZER DIVISIONS"



Rommel and his staff rest on the grass while planning their next advance through France

about two hours yesterday evening, on military problems. He's extraordinarily friendly toward me!" The growing admiration between the two encouraged Rommel to ask Hitler for what he really longed for – command of one of the new Panzer divisions.

In February 1940, Rommel's wish was granted, and he was ordered to take command of the 7th Panzer Division. Early each morning he jogged a mile, intent on regaining his fitness after months spent with Hitler's headquarters. He was determined to be as fit for the coming campaign as any of his young officers – in just three months, Rommel had to learn his new role as a Panzer commander. He feverishly trained and experimented with his new command, devouring all the information on tank warfare he could find. On 9 May, Rommel received the order to ready his division for war. He frantically wrote a brief letter home, ending it with: "It's going to be all right. We jump off at dusk, how long we've been waiting for this moment!"

At dawn the next morning, the invasion of France began, and in just 20 days Rommel tore across northern France in what he later described as "a lightning Tour de France". The 7th Panzer Division moved so fast that at times not even German high command knew where

THE FOX'S FORMATIVE YEARS FROM A SICKLY CHILD TO DECORATED WAR VETERAN

Born in Württemberg, southern Germany, Rommel was a sickly youth with dreams of becoming an aeronautical engineer. At 18 his father persuaded him to join the army, but both the artillery and engineers rejected him, before the infantry accepted him in 1910. Described by his Commandant as "firm in character, with immense willpower and keen enthusiasm... a useful soldier." Rommel proved himself more than just a 'useful soldier' during World War One. Fighting in France, Romania and Italy with bravery, skill and tenacity, he became adept at leading raiding parties behind enemy lines.

In 1915 he was awarded the Iron Cross for raiding French bunkers in the Argonne forest, losing just a dozen men. In Italy Rommel excelled, displaying a flair for independent and decisive action and in 1918 was awarded Germany's highest gallantry award, the Pour le Mérite, the famed 'Blue Max'. He ended the war as a captain, and despite its post-war decimation, remained in the army. During the inter-war years he published several books on aggressive infantry tactics. By 1937 he had reached the rank of Colonel and gained the attention of Germany's new Chancellor, Adolf Hitler.



they were, earning them the nickname 'the Ghost Division'. Naturally, Rommel led from the front, as his division burst out of the Ardennes forest to cross the Meuse river. Seeing engineers building a pontoon bridge under heavy fire, he leapt into the river waist-deep to help them.

The speed and unexpected direction of the German advance caused much confusion

among the Allies. On 15 May, after leading his division through the French town of Avesnes, Rommel and his staff paused when a French woman tapped him on the shoulder to ask, "Are you English?" Rommel politely replied in French; "No ma'am, I'm German!" Realising her mistake the French Woman ran back to her house screaming "Oh, barbarians!"



BLITZKRIEG

GERMANY'S REVOLUTIONARY 'LIGHTNING WAR' THAT BROUGHT FRANCE TO ITS KNEES

Between 1939 and 1941, Nazi Germany's army swept through Europe, overwhelming all resistance. The secret to their success was a new kind of war – Blitzkrieg. This combined a Panzer spearhead that punched through the enemy's lines with close air support – a concept alien to the Allies in 1940 – and fast-moving mechanised infantry following up the Panzers, exploiting their advance. This new combined-arms doctrine was developed in Germany by Heinz Guderian, who knew the key to rapid, decisive action was communication between the army's individual elements.

Blitzkrieg met its first test during the invasion of Poland in 1939 when German Panzers and Stuka dive-bombers smashed the Polish army in just a month. A year later, on 10 May 1940, the Panzers burst through the Ardennes Forest and raced across France, reaching the Channel in just seven days – a journey of over 200 miles. Erich von Manstein and Heinz Guderian masterminded the German strategy for the invasion of France – armoured divisions were to break through French lines and sweep west to the channel, causing the strategic collapse of the Allies.

Allied forces were stunned by the speed of the German advance – within days they were



psychologically shattered, harassed by the Luftwaffe and unable to muster for a counterattack. Outmanoeuvred, the British Expeditionary Force was forced to retreat to Dunkirk and was evacuated at the end

of May, leaving the French to fight on alone until they collapsed and surrendered on 22 June 1940. The concept of Blitzkrieg remains at the heart of modern mechanised warfare today.

Rommel recognised that maintaining momentum was critical, and he was willing to outpace the slower elements of the army to achieve success. He knew that despite the risks to his rear and flanks, by pressing deep into enemy territory he could deal a devastating blow to Allied morale and cohesion. The only time Rommel's strategy was threatened was on 20 May when a hastily cobbled together British brigade launched a counterattack into his division's flank near Arras. As British tanks attacked his position, Rommel was once again in the thick of the action. Despite being exhausted by ten days of constant fighting, he began directing artillery fire onto the enemy tanks. In his diary Rommel described just how close the action was: "Only rapid fire from every gun could save the situation. We ran from gun to gun... All I cared about was to halt the enemy tanks by heavy gunfire." Rommel only realised how dangerous the situation had been when his aide, who had helped him sight the guns, fell mortally wounded. He remained resolute, rallying his division to beat off the attack. While the counterattack never posed a real threat to the German offensive, it is notable as the first time Rommel engaged the British in battle.

Blitzkrieg perfectly suited Rommel's style of fighting and leadership. The battle for France had been a stunning success. Some of his Panzers had fought their way from Sedan to the Channel in just seven days, covering an astounding 200 miles. He had captured over 100,000 enemy troops,

"THE BATTLE OF FRANCE HAD BEEN A STUNNING SUCCESS. SOME OF HIS PANZERS HAD FOUGHT THEIR WAY FROM SEDAN TO THE CHANNEL IN JUST SEVEN DAYS, COVERING AN ASTOUNDING 200 MILES"



Rommel first engaged British force during the Invasion of France, but would soon meet them again in North Africa

including the entire 51st Highland Division and the garrison of Cherbourg. Rommel's success vindicated his bold, swift and decisive style of command.

Into the desert

In February 1941, the general was given command of an expeditionary force and ordered to rally routed Italian forces in Libya. Over the next two years Rommel and the Afrika Korps covered thousands of miles of desert in some of the harshest conditions imaginable – oppressive heat, choking sandstorms and the constant shortage of water and fuel. The terrain of the western Desert was unique, a flat, stony plain 200 kilometres wide, separating the Mediterranean and the dunes of the Sahara. In April 1941, without waiting for his whole force to land, Rommel sensed an opportunity and struck the British, taking them by surprise and pushing them back 900 kilometres to the Egyptian border. The audacity and initiative of this attack became his trademark.

**"WHEN THERE WAS DANGER, HE WAS
ALWAYS OUT IN FRONT CALLING ON US TO
FOLLOW. HE SEEMED TO KNOW NO FEAR
WHATEVER. HIS MEN IDOLISED HIM"**

Theodor Werner – Rommel's aide





THE AFRIKA KORPS

GERMANY'S ELITE DESERT WARRIORS HONED BY ERWIN ROMMEL

The Deutsches Afrikakorps (DAK) was formed in February 1941, made up of just two divisions. Rommel was placed in command and rushed into action to Libya to bolster the reeling Italian forces there.

While the 'Afrika Korps' became the Allies' catch-all term for Axis forces in North Africa, the DAK was actually only part of a larger German-Italian force. When it arrived it boasted 300 tanks, with the majority of these being the lightly armed and armoured Panzers I and II. Rommel also had a number of the more formidable Panzer III and IV.

Deployed in the shadow of preparations for Operation Barbarossa, the invasion of Russia, the DAK was never made up of more than three divisions. By early 1942, Axis forces in North Africa had been reconstituted as Panzerarmee Afrika, with Rommel directly commanding both the Afrika Korps and six Italian divisions. Under Rommel's leadership the Korps gained a reputation as an elite force, always under-supplied and often relying on captured vehicles and fuel, but renowned for its toughness and fighting ability.



It was in the desert that Rommel showed his true brilliance, bringing together a disparate, poorly equipped and under-supplied army. Leading them across thousands of miles of desert, he used his instinct and daring to outfox half a dozen British generals. Rommel had the ability to inspire those around him with his own professional enthusiasm, from the lowliest private to the brigade commanders. His aide, Theodor Werner, later recalled: "Anybody who once came under the spell of his personality turned into a real soldier. However tough the strain, he seemed inexhaustible." Rommel himself knew it, and in March 1941 wrote home to Lucie that "much depends on my own person and my driving power."

Unlike typical corps commanders, who remained in their headquarters directing troops from the rear throughout engagements, Rommel always favoured being at the front, leading his men in sectors he identified as crucial. Werner remembered that, "When there was danger, he was always out in front calling on us to follow. He seemed to know no fear whatever. His men idolised him."

Rommel's successes cemented his reputation as the Wehrmacht's most popular general. The 50-year-old general cut a dashing figure in his leather jacket and dust goggles,



DESERT CAMPAIGN THE LEGEND OF THE DESERT FOX IS BORN

Rommel arrived in Libya in February 1941, tasked with saving the Italian army. Even before all of the Afrika Korps had arrived, he sensed an advantage. Rallying his Italian allies, he stuck at the British Western Desert Force, halting their advance and pushing them back to the Libyan-Egyptian border, before laying siege to Tobruk. This began two years of battle, which raged up and down the North African coast. In November 1941, the British launched Operation Crusader, relieving the embattled port and forcing Rommel to fall back to El Agheila where his offensive had begun months earlier.

After being resupplied, Rommel launched his second offensive in May 1942, catching the British off guard again and capturing Tobruk. His audacity paid off, and he sent superior Allied forces reeling back into Egypt.

By July 1942, months of heavy fighting and a supply line stretched over 1,000km left Rommel with just 13 operational tanks – both armies were exhausted. The Fox was unable to convince Hitler that the campaign in North Africa was as vital as the invasion of Russia. As a result, the Afrika Korps was chronically under-equipped and under-supplied. In September, General Montgomery's 8th Army struck back first at Alam El Halfa and again at El Alamein. Rommel's last roll of the dice was anticipated by Montgomery, so the Afrika Korps was forced to begin a long and arduous retreat back to Tunisia. In March 1943, Rommel was recalled back to Berlin and in May the remnants of the once superior Afrika Korps surrendered.



riding in the turret of his command tank. With success came fame at home, and in 1941, Joseph Goebbels' newspaper *Das Reich* attempted to re-write his life story painting him as one of the Nazi Party's loyalist early members. Rommel was outraged – ever his own man, he had never been a member of the Nazi Party. Despite the possibly fatal consequences, he demanded the lies be retracted, and *Das Reich* was compelled to print the correction of the general's background.

"UNLIKE TYPICAL CORPS COMMANDERS, WHO REMAINED IN THEIR HEADQUARTERS DIRECTING TROOPS FROM THE REAR THROUGHOUT ENGAGEMENTS, ROMMEL ALWAYS FAVOURED BEING AT THE FRONT, LEADING HIS MEN IN SECTORS HE IDENTIFIED AS CRUCIAL"

The Desert Fox's reputation for cunning and improvisation became legendary – he used tricks such as having trucks drag brush behind them to kick up enough dust to simulate an advance, only to strike elsewhere. He lured the unsuspecting Allies into deadly traps by feinting advances to draw in British tanks, only to lead them into ambushes. Most famously, at the Battle of Gazala, Rommel unexpectedly fell back to entice the British to attack into what he described as 'the Cauldron', where they

Rommel's had a reputation for leading from the front, directing his men personally





Rommel and his staff inspecting the beach defences along the French coast

were picked off by carefully hidden anti-tank guns. For his victory at Gazala, Rommel was promoted to Field Marshal in June 1942.

However, Rommel's luck could not hold forever, and by mid-1942 he had overstretched himself raiding into Egypt in the hope of shattering the Allies' resolve as he had in France. While the desert was a tactician's paradise, it was a logistical nightmare, and Rommel struggled to supply his men throughout the campaign, relying on captured Allied supplies. At one point in July 1942, he had just 13 operational tanks, and was again forced to retreat into Libya. He wrote home in despair to Lucie: "This means the end. You can imagine what kind of mood I'm in... The dead are lucky, it's all over for them."

General Montgomery, the new commander of the British 8th Army, had studied Rommel's tactics and prepared meticulously. The British general defeated his rival at Alam el Halfa and El Alamein with an overwhelming superiority in tanks, men and aircraft. With the odds stacked against him, Rommel wrote home in despair: "Nobody can ever know the burden that lies on me, all the cards are stacked against us."

In February 1943, he won one last battle at the Kasserine Pass against US troops, but with limited ability to seize the initiative and exploit his early success, he decided to retreat before the Allies could concentrate their forces. By March, Rommel was physically and mentally spent, with his letters home increasingly despondent: "The end will not be long for we're being simply crushed by the enemy superiority... I wish I could get free of these

terrible thoughts." On 10 March, the Desert Fox was relieved of command in North Africa and placed on sick leave.

Not even Rommel's tactical genius could outweigh the numerical superiority the Allies brought to bear against the Afrika Korps. It is a testament to true skill that he was able to achieve so much with so little.

Defending Fortress Europe

After a brief posting to Italy, where Axis forces fail to push back the Allied invasion, Rommel was transferred to France and tasked with inspecting and improving Hitler's Atlantic Wall. He understood that in Italy the Axis had lost the initiative by allowing the enemy to consolidate once they had landed. In France, he argued that it was essential that they position troops close to the coast to counterattack immediately, but this was challenged by his immediate superior, Field Marshal von Rundstedt.

Despite the static nature of the Atlantic Wall's coastal defences hampering Rommel's style of mobile warfare, his keenly practical mind was able to improve the defences. He was shocked to see how incomplete the work on the defences was in various sectors, and was able to tackle technical problems almost as well as he did tactical ones. He set about peppering the beaches with obstacles and filling the open fields near the coast with poles called Rommelspargel, or 'Rommel's asparagus', which would make it difficult for Allied gliders to land safely.

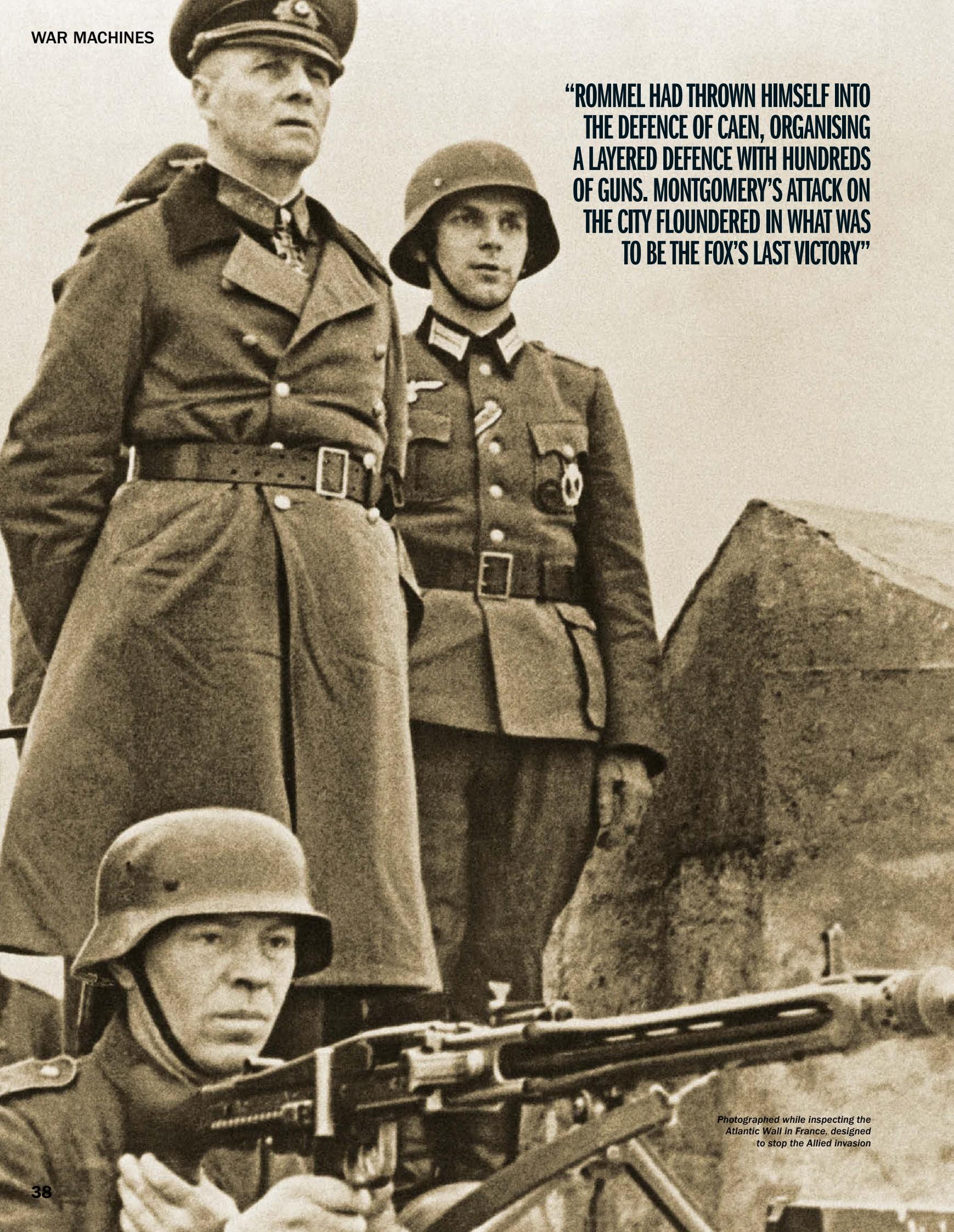
The Wehrmacht's standard tactic for dealing with amphibious landings involved a

DEFENDING NORMANDY PREPARING HITLER'S ATLANTIC WALL

As early as 1941, Hitler and the German high command began planning on how they would defend the Third Reich's extensive coastline. In March 1942, Führer Directive 40 officially ordered the construction of a series of defences along the western coast of Europe – running for 1,670 miles from the northern shores of Norway to the Bay of Biscay. The construction of what became known as the Atlantic Wall saw thousands of bunkers, gun batteries and resistance posts built. 40 million tonnes of concrete, 1.2 million tons of steel and thousands of miles' worth of barbed wire were used. In Northern France alone, 6 million mines were laid and the beaches were peppered with Czech hedgehogs, Belgian gates and Hemmbalk obstacles for ripping out the bottoms of landing craft.

The cost of building the Wall is thought to have been a colossal 3.7 billion Deutschmarks. Despite this, the Normandy beaches targeted by Operation Overlord were considerably weaker than those in the Pas de Calais area, where the German high command anticipated the landings would take place. The Luftwaffe had just 400 planes stationed in France, and the 50,000 troops available in Normandy were made up of invalids and second-rate units. While the 130,000 Allied troops that landed on 6 June met with initial success, they weren't able to break out of the beachhead until August – in part due to the dogged defence that Rommel organised.

"ROMMEL HAD THROWN HIMSELF INTO THE DEFENCE OF CAEN, ORGANISING A LAYERED DEFENCE WITH HUNDREDS OF GUNS. MONTGOMERY'S ATTACK ON THE CITY FLOUNDERED IN WHAT WAS TO BE THE FOX'S LAST VICTORY"



*Photographed while inspecting the
Atlantic Wall in France, designed
to stop the Allied invasion*



concentration of panzer and panzergrenadier divisions on the enemy beachhead. However, this took vital days to prepare, and the strategy had failed a year earlier in Italy. Rommel began to consider alternative strategies, believing that the "enemy's entire landing operation must under no circumstances be allowed to last longer than a matter of hours" and that the invasion could only be crushed on the beaches.

As his frustration at being unable to deploy his troops as he wished grew, he frequently took it out on his staff. One of his corps commanders in Normandy wrote home, saying, "If there's something he doesn't like, then all his pigheaded rudeness comes out." In early 1944, he passionately argued to Hitler that "if we don't manage to throw them back at once, the invasion will succeed in spite of the Atlantic Wall!" However, depression and self-doubt again consumed him as he became bogged down by his feud with Von Rundstedt over the positioning of troops close enough to the coast to strike quickly. In April 1944, he wrote in his diary: "And what will history say in passing its verdict on me? If I am successful here, then everybody else will claim all the glory... if I fail here, then everybody will be after my blood."

Despite these setbacks to his preparations, the general lost none of his grounded spirit as a soldier. In May 1944, he again displayed the chivalry for which he had become known when he interrogated Captain Roy Wooldridge, a British engineer captured while scouting the Normandy beaches. Two years earlier, Hitler had ordered that all captured commandos were to be shot. Instead, Rommel gave Wooldridge a packet of cigarettes and a meal before sending him to a POW camp.

On 6 June 1944, the Allies launched Operation Overlord, the long-anticipated invasion of France. As the enemy hit the beaches, Rommel was at home in Ulm visiting Lucie and his son Manfred. On hearing of the landings, he raced back to his headquarters. Throughout June, Rommel doggedly threw his men into the battle. At Villers-Bocage, Panzers and Allied tanks clashed in the region's narrow country lanes. Around Caen, his troops managed to beat off successive Allied attacks. Rommel was no less energetic in Normandy than he had been in the desert, frequently covering 200 miles a day meeting with his commanders.

The Fox's Downfall

In North Africa, Rommel had been his own master, blissfully detached from Hitler and high command. Once back in Europe, he found himself embroiled in military and party politics and bogged down by the chain of command. But regardless of his growing pessimism and arguments with superiors, Rommel had thrown himself into the defence of Caen, organising a layered defence with hundreds of guns. Montgomery's attack on the city floundered in what was to be the Fox's last victory.

Several days later, on the evening of 17 July, Rommel's staff car was driving down the main road towards Vimoutiers when a pair of roaming Spitfires dived, strafing his car with cannon and machine-gun fire. Rommel's mortally wounded driver wrestled to keep control, but the car careened into a tree. Rommel suffered



Despite being supported by Hitler early on in the war, Rommel became implicated in plots to assassinate the Führer

ROMMEL & HITLER THE GENERAL AND HIS PATRON

Rommel was uninterested in politics, but like many he was ensnared by Hitler's charisma, believing him to be the best hope for Germany's future. In 1937, Hitler had been impressed by Rommel's book *Infantry Attacks*, and in 1938 appointed him the army's liaison to the Hitler Youth before giving him command of his bodyguard in 1939. During the invasion of Poland, Hitler and Rommel became closer and Rommel enthusiastically wrote home telling Lucie that Hitler had made "soldiers worth something again."

As Rommel left to command the 7th Panzer division, Hitler handed him a farewell gift, a copy of *Mein Kampf* inscribed: "To General

Rommel with pleasant memories." With Hitler's patronage, Rommel, who had stagnated as a captain for 15 years, rose to Field Marshal in just four years. Isolated in North Africa for two years, it was not until his return in 1943 that he realised the extent of Hitler's madness and the hopelessness of Germany's situation.

As the war dragged on, Hitler became increasingly deluded, refusing to listen to reason. With each attempt Rommel made to convince Hitler the war was lost, the further from grace he fell. Finally, in late June 1944, during a meeting of senior commanders, Rommel was determined to question the Führer's plans. Hitler reacted furiously and dismissed him. Following the failed 20 July plot, Rommel was implicated and an increasingly paranoid Hitler ordered his death.

horrendous head injuries, and the first surgeon to examine him did not expect him to live. As had become characteristic of him, he would defy the odds and survive. However, his luck wouldn't hold out.

By late 1944 it had become clear that Germany could not win the war, and it was Hitler's decisions that were dragging the country down, so a group of officers began to plot how they could remove Hitler and make peace. Because of his popularity among the German people, as well as the respect he

commanded from not just fellow officers but also the enemy, the conspirators approached Rommel in early 1944. He was told of plans for a coup d'état to remove the Führer from power. The Fox, by his very nature, was loyal. Writing to his son Manfred in 1943, he said, "Only the man who has learned how to obey, even against his better instincts and convictions, will make a capable officer." Despite this, Rommel had been questioning his own convictions and loyalty to Hitler. While he did not become directly involved, he became inexorably linked

"ROMMEL HAD NO KNOWLEDGE OF THE PLAN TO DETONATE A BOMB AT THE MEETING WITH HITLER, BUT THE PLOT'S FAILURE WOULD HAVE TRAGIC CONSEQUENCES FOR THE RECOVERING FIELD MARSHAL"

to the conspirators. On 20 July 1944, as Rommel lay unconscious in hospital recovering from his wounds, an explosion ripped through a meeting room at Hitler's eastern headquarters, the Wolf's Lair. Hitler survived with minor injuries, but became gripped by paranoia and a massive investigation was launched. Rommel had no knowledge of the plan to detonate a bomb at the meeting with Hitler, but the plot's failure would have tragic consequences for the recovering Field Marshal. Rommel's name was found on a list of officers who would be key after a coup, and was even mentioned by tortured conspirators.

As the war in Europe entered its final stages, Rommel continued his recovery at his home near Ulm. On Hitler's orders, the Gestapo was busy rooting out and executing dozens of conspirators, and on 14 October two generals told him he had been implicated in the plot. They gave him a grim choice; a show trial before the People's Court or commit suicide with the guarantee his family would be safe.

Rommel faced this betrayal and impending death with the same bravery he had displayed on the battlefield countless times. Weighing up his situation, he chose to commit suicide. Saying goodbye to his wife and son, he left with the generals. 30 minutes later, the Fox was dead. Official reports claimed he'd suffered a heart attack, but in truth he'd taken the cyanide that the generals had brought with them from Berlin. Rommel's state funeral saw his coffin draped in a swastika, against the Fox's wishes, while Nazi party members eulogised. Hitler did not attend. His wife Lucie was forced to remain quiet about the truth behind her husband's death throughout the spectacle.

The legend of this talented commander has endured for over 60 years, with his masterful use of terrain and his ability to predict his enemy's next move marking him out as one of modern warfare's greatest generals. Rommel shot to fame as the energetic commander of the 7th Panzer division, but it was in the vast deserts of North Africa that his reputation as a tactical genius was cemented. Despite his flaws and struggles with depression, his ability to inspire men and use guile and cunning to outwit his enemies was phenomenal. He was charismatic and honourable – one of very few senior German commanders that not only ignored, but directly challenged Hitler's orders to kill Jewish soldiers and civilians, as well as captured Allied commandos.

His legacy is unique among his contemporaries, as he is the only general of the Third Reich to have a museum dedicated in his honour. He is immortalised as a brilliantly able commander who was betrayed by the regime he had loyally served.

"ROMMEL FACED THIS BETRAYAL AND IMPENDING DEATH WITH THE SAME BRAVERY HE HAD DISPLAYED ON THE BATTLEFIELD COUNTLESS TIMES"

Against his wishes, Rommel's funeral was adorned with all the trappings of the Nazi party





War Machines

SU-76M TANK DESTROYER



SU-76Ms replaced the original SU-76 with updated engines, transmissions and shock absorbers

Meet the tank killer that helped halt the German advance into Soviet lands and turn the tide of Russia's Great Patriotic War

If the First World War was the birth of tanks, the Second World War was the birth of tank killers. Used in high numbers by the Wehrmacht and Red Army (but not so much by the Allied powers). A field gun attached to a tank chassis would create a mobile heavy gun and an infantry support weapon in the field of battle. The SU-76M was the successor to the original SU-76 and was mass-produced by the USSR in an attempt to defeat the Panzers that were advancing ever eastwards. Production began in December 1942 and they became a triumph of Soviet handiwork. Hastily produced, they paled in comparison with their German equivalents but their sheer numbers (over

"THE SU-76M WAS MASS-PRODUCED BY THE USSR IN AN ATTEMPT TO DEFEAT THE PANZERS THAT WERE ADVANCING EVER EASTWARDS"

12,500 were built) meant they could easily outflank any German advance. This was a factor in the reverse in fortunes of the Germans on the Eastern Front at the Battle of Kursk.

After the end of the war, the SU-76M model was used in the Korean War on the side of the Communist forces of North Korea until it was phased out by more-modern vehicles and methods of warfare. Even when they were

replaced, many were stripped of their guns and remodelled into ammunition carriers and battlefield recovery vehicles. There were many different SU-76s in the Red Army. The SU-7B had a closed crew compartment while the SU-76P and SU-76I were based on the Soviet T-26 and German Panzer III. The design also set out the template for the ZSU-37, which became the Soviet self-propelled AA gun of choice.

SU-76Ms used their camouflage and the terrain to stealthily advance upon unwitting enemy tank divisions



Soviet soldiers hitch a ride on an SU-76M as they liberate a German town

SU-76M

COMMISSIONED December 1942

ORIGIN USSR

LENGTH 4.88m (16ft)

WIDTH 2.74m (9ft)

ENGINE 2x 85hp GAZ-203

CREW 4

ARMOUR 35mm (front), 16mm (sides)

SPEED 44km/h (27.3mph)

PRIMARY WEAPON 1x 76.2mm ZiS-3 L/41 field gun

SECONDARY WEAPONS • Degtyaryov machine gun

• Crew's personal arms



76MM GUN

By 1942 the Soviets were taking the full brunt of the Nazi onslaught on the Eastern Front. The mass-produced T-34 tanks were effective but something more was needed to tilt the war in their favour. The decision was made to begin the production of so-called 'tank destroyers' that would halt the Panzer advance.

The 76.2mm gun fared well against the Panzer III and IV but as stronger German tanks rolled onto the front, the SU-76M was reduced to an infantry support vehicle, as it could not penetrate the thick armour of the Tiger and Panther tanks. Some models of the SU-76 could also have anti-aircraft guns mounted instead and there was also a short-lived prototype with a 57mm armament as the Red Army tinkered with the tank-destroyer formula.

The 76.2mm gun was effective against the earlier Panthers but found it very difficult to puncture a Tiger's thick armour



**"THE MOST EFFECTIVE TACTIC
WOULD BE TO FLANK A
PANZER AND CATCH IT OFF
GUARD WITH A STRIKE ON
THE WEAKER ARMOUR"**

GAZ-203S ENGINE

The original SU-76 was powered by two GAZ-202 engines but they were replaced on the SU-76M with GAZ-203s due to issues with the transmission. Coupled with the loss of weight due to the open top, the engine and machinery within the SU-76 generally worked quite well.

They were the polar opposite of the German-made tank destroyers such as the Jagdtiger, which were more powerful but much fewer in number. The chassis of the SU-76M was taken from the Soviet T-70 tank, as this light tank was slowly being phased out by the Red Army. The model wasn't particularly popular with the crew due to its limited protection but it nevertheless assumed an important role within the USSR forces.

The rear of the vehicle was uncovered, which made it easier to communicate and operate but much more dangerous



35MM ARMOUR

The tank killer's game was based on using camouflage and cover rather than going in all guns blazing. The most effective tactic would be to flank a Panzer and catch it off guard with a strike on the weaker armour at the side or rear. If the SU-76M was caught out in the open, it had 35mm armour on its front and 16mm on its sides. This armour was strengthened on the later SU-76Ms that served in the final months of the Second World War and the Korean War. Unlike a tank, the SU-76 was open at the back to allow the gunner and loader to communicate with other vehicles with hand signals. The downside to this was the lack of protection to the crew. This was rectified on several later designs but they never made it past the prototype stage.



The armour of the SU-76M wasn't famed for its thickness and could be pierced by machine gun fire

THE OTHER TANK KILLERS

THE SU-76M WASN'T THE ONLY VEHICLE ON THE BATTLEFIELD THAT WAS DESIGNED TO ELIMINATE TANKS

STURMGESCHÜTZ III GERMAN

Based on the body of a Panzer III, the StuG III was the German equivalent of the SU-76M. It was employed in a defensive role and its 75mm gun could penetrate 85mm thick tank armour from over 1,000m (3,280ft) away.



M10 AMERICAN

The M10s were based on Sherman M4A2 tanks and were employed in Western Europe in specialised tank destroyer battalions. The M10s had thick 37mm armour and were implemented into the Danish, Dutch and Belgian armies during the struggle against the Wehrmacht.



ARCHER BRITISH

An unusual design, the Archer was born out of the British army's desire to create a mobile transport for its 17 pounder anti-tank gun. Despite being unable to fire when moving, the Archers proved successful and were in use until the Fifties.



JAGDTIGER GERMAN

The heaviest tank killer of them all, the Jagdtiger was produced far too late to have any affect on the war. Only 80 of these 70-ton machines were made and they were constantly dogged with engine and fuel issues.



THE SU-76M IN THE FIELD

TANK MUSEUM WARDEN TOM MOORCROFT ON THE FAMOUS RUSSIAN TANK KILLER

What role did the vehicle have on the battlefield?

It was mainly used for heavy suppressing fire and pursuing tanks. It is basically a mobile artillery gun. The difference between it and a tank is that a tank has a turret.

How did it stand up against the German Tiger Tanks?

The SU-76, as the name says, has the smaller 76mm gun. It was later upgraded to an 85mm gun to combat the Tiger and Tiger II whose armour was far too thick to penetrate. Ideally this vehicle would be used against smaller tanks such as the Panzer III and Panzer IV.

What were the conditions like inside?

Pretty much the same as any tank but it's open at the back and is essentially a convertible! The loader and gunner would be on the rear while the driver sat below the gun at the front. It's based on the T-34 but it is actually quite dissimilar with its open roof.

What tank was it most effective against?

Only the Germans and the Russians really used tank destroyers, as the UK and the USA preferred just using tanks. When used with tanks and machine guns, it could hold off an enemy advance. Even

when enemy tanks weren't spotted, the SU-76 could be very effective as a camouflaged artillery gun against infantry before the main armoured column arrived.

Did it have any flaws?

The problem with a tank destroyer is the limited movement of the gun, which can only aim up and down and not 360 degrees. If you want to fire left and right, you have to move the whole vehicle. When enemy convoys split up, an SU-76 could be easily outflanked. However, this vehicle is a very good example of Russian mechanical reliability. German tank killers such as the Jagdtiger were so complicated to build, by the time you've made one of them, you've made many SU-76s. They are very crude in their design but you just make as many as you can.

After the Korean War ended, did tank killers become obsolete?

Well, that argument has been going on throughout the history of the tank – is the tank really relevant? Personally, if the enemy has tanks, you're always going to need tanks yourself in order to lead a counterattack. In the territory of the Korean War, you can't really use tanks in urban warfare but they are still very effective in open fields as long as you don't get bogged down!



Below: The rear of the SU-76M was open to the elements, giving the gunner and loader little to no protection



Below: A wrecked North Korean SU-76M captured and examined by the US Army in the Korean War





TANK DESTROYERS IN MODERN WARFARE

ARE TANK KILLERS RELEVANT IN TODAY'S CONFLICTS?

After the Second World War, Nazi Germany went through a mass disarmament process and the USSR sheltered behind its impenetrable Iron Curtain. So, what happened to the tank destroyer? The SU-76M model was sold in large swathes to North Korea but as tanks got stronger and wars became more covert in nature, the role of the tank destroyer began to diminish.

Some still remain today, although they look different to the World War Two vintage. Rather than installing field guns, missile launchers are now a much more effective way of laying waste to armoured tanks on the battlefield. Although lightly armoured, the missile's guided systems allow the tank destroyer to strike from a reasonable distance.

"AS TANKS GOT STRONGER AND WARS BECAME MORE COVERT IN NATURE, THE ROLE OF THE TANK DESTROYER BEGAN TO DIMINISH"



Taking its lead from the US M-113, the Norwegian Model-142 uses a TOW2 guided missile system to blast tanks out of the battlefield



This British tank destroyer was introduced in 1975 and saw service in the Gulf War. Its Swingfire missiles have a range of 4,000m (13,120ft)



Breaking away from the traditional look, this was the first guided missile anti-tank vehicle to be produced when it made its debut in 1962

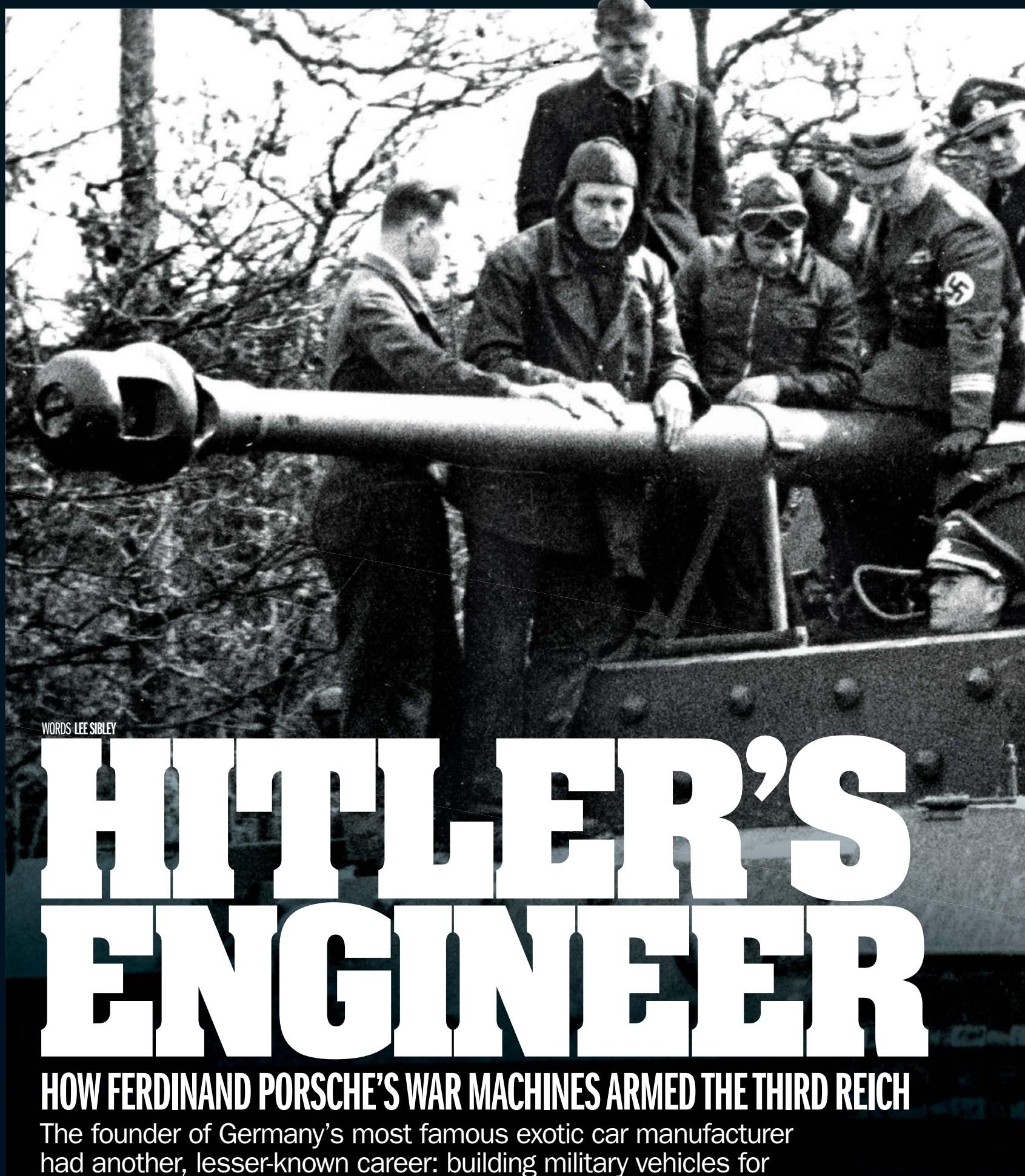
THE TANK MUSEUM

Situated in the Bovington Army Camp in Dorset, The Tank Museum was opened in 1947. It contains over 300 vehicles from 26 different countries, from the First World War Mark I tank to the currently serving Challenger 2. The SU-76M is situated in the Discovery Centre and was captured during the Korean War before being given to the museum. Although this tank does not run, the museum holds numerous events throughout the year when visitors can see these historic machines brought to life.

Visit www.tankmuseum.org for the museum's opening hours and admission information.



The Tank Museum: Alamy; Getty



WORDS LEE SIBLEY

Hitler's Engineer

HOW FERDINAND PORSCHE'S WAR MACHINES ARMED THE THIRD REICH

The founder of Germany's most famous exotic car manufacturer had another, lesser-known career: building military vehicles for the German army across the two world wars

Albert Speer takes a Type 130 Ferdinand for a spin, with Ferdinand Porsche perched to his left



He may be one of Germany's most famed entrepreneurial engineers – with his automotive company today making some 14,326 million Euro in revenue – but the origins of Ferdinand Porsche's engineering legacy lies far away from the boulevards that now host his glamorous sports cars. Instead, the Czech-born stalwart has an incredible yet relatively unknown facet to the early stages of his career: building a series of vehicles for use in the German military, before eventually swapping trenches for tarmac to further exert his engineering prowess.

The son of a tinsmith, Ferdinand displayed attributes of a competent engineer from an early age, bringing electricity to his home and his family's workshop by the age of just 13. He soon turned his fascination with electricity into a career, joining Austria's most revered company in electrical equipment, Bela Egger and Company (the German acronym of which was VEAG). The 18-year-old Ferdinand wasted little time displaying traits of a competent engineer, progressing quickly at VEAG from a trainee to the man in charge of the test laboratories. It was here that Porsche met Ludwig Lohner, an esteemed Austrian coachbuilder of the 19th century who was keen to explore opportunities for electric vehicles.

Lohner's willingness to examine the worth of electric vehicles sat perfectly with Porsche's own interest in the motor vehicle and potential of wheeled power (Porsche had himself invented his own electrocycle for his commute to work) and likewise Lohner was impressed with the young Porsche's ability to find solutions to seemingly tricky problems. For example, Porsche foresaw the switch of engines to the front of a vehicle, where they could be cooled much easier when in motion.

Porsche soon left VEAG and went to work for Lohner, where a variety of vehicles powered by both batteries and engine-driven dynamos were built. The clout of the electric Lohner-Porsche vehicle quickly gained momentum with Vienna's elite, and by 1901 Ferdinand was looking at what would today be known as hybrid vehicles.

Borrowing a 5.5-litre four-cylinder internal combustion engine from auto manufacturers Daimler, Porsche made his first 'Mixte', a French expression to define the blend of both petrol and electric powertrains. The petrol engine of Porsche's vehicle drove a dynamo under its front seats, which then sent electricity to its front-wheeled motors.

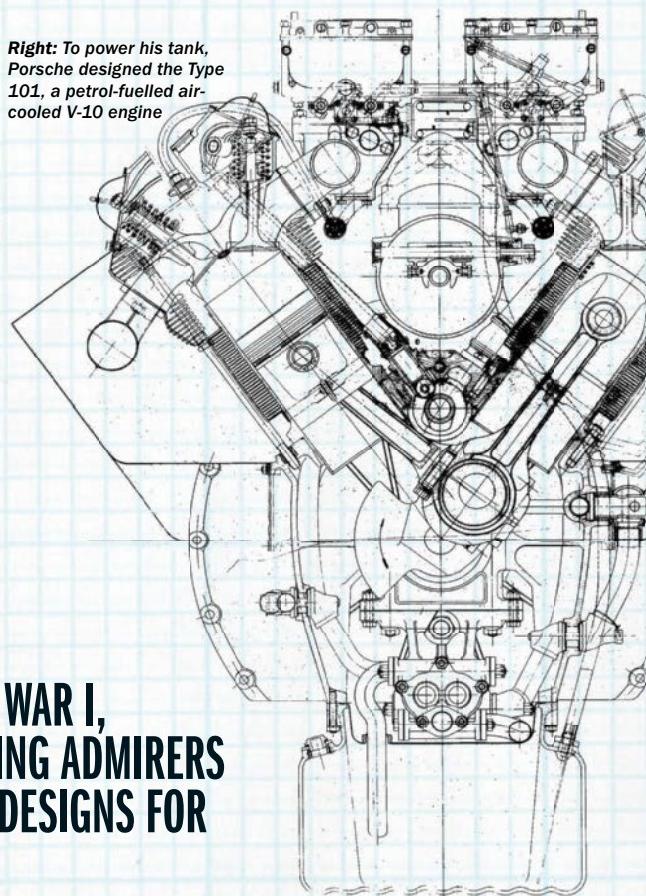
With a revised chassis, Porsche entered his new vehicles into hillclimb competitions, winning the large car class and setting a new record for the hill at Austria's Exelberg hillclimb in April 1902. From here, he drove down to Sarvar to take part in Austria-Hungary's 1902

military manoeuvres. Porsche and his vehicle impressed Franz Ferdinand, who Porsche had chauffeured, and the archduke later had one of his assistants write to Porsche to express "how satisfied His Most Serene Highness was in every respect." Ferdinand Porsche's move to garner interest in his vehicles from the military had worked, and it would soon spawn a 40-year career working for the armed forces.

By the outbreak of World War I, Porsche was already winning admirers with his groundbreaking designs for military vehicles. He'd designed powerful tugs with four-wheel drive for towing artillery through fields (first the 50-brake-horsepower M 06 in 1906 followed by the 80-brake-horsepower M 08 in 1910, then the 'Hundred' M 12 with 100 brake horsepower in 1912). These heavy-duty designs were welcomed at a time when there were rising tensions inside and outside the dual Austro-Hungarian empire.

This paid dividends: after the assassination of Archduke Franz Ferdinand by Bosnian militia,

Right: To power his tank, Porsche designed the Type 101, a petrol-fuelled air-cooled V-10 engine



"BY THE OUTBREAK OF WORLD WAR I, PORSCHE WAS ALREADY WINNING ADMIRERS WITH HIS GROUND-BREAKING DESIGNS FOR MILITARY VEHICLES"

THE SCHWIMMWAGEN

PORSCHE'S AMPHIBIOUS CAR WAS NEEDED FOR THE GERMAN ARMY'S FUTURE MARITIME MISSIONS

Internally named the Type 166, the Schwimmwagen (or swimming car) was borne out of the need to take machinery – and the battle – across waters in what was evidently a new maritime frontier for the German war initiative. Ferdinand received a request for an amphibious version of the all-wheel drive Type

87, and the German army specified a top speed on land of 50 miles per hour and six miles per hour in water. The transition from water to land also had to be achieved without the occupants exiting.

The Schwimmwagen took approximately three months to develop and witnessed various changes to its design in that short time. Essentially a

modified version of Volkswagen's Kübelwagen, the vehicle became doorless, while weight was trimmed and rear stowage space sacrificed to help seat four occupants.

Watertight seals were fitted to both axles and all mechanical cables, including those for the brakes. An engine-driven propeller was positioned at the rear of the vehicle after initially being housed. After much testing, the wheelbase was shortened to aid agility, particularly in getting in and out of the water, a result of increased funding of the project by the Waffen SS.

The Schwimmwagen had four-wheel drive and was propelled by a 25-brake-horsepower engine with air-cooling pipes placed well above the water line, while the exterior metalwork was treated to 'panzergrau' (green-grey) paint. No weaponry was mounted to the Schwimmwagen, though the vehicle's unrivalled versatility in land and water meant it proved a valuable asset – particularly in occupied territory – to Germany in World War II.

Buoyed by additional funding from Himmler and the Waffen SS, Ferdinand sent his son Ferry to present the final Schwimmwagen to Hitler in 1941, who was impressed with what he saw.

After various tests in a variety of terrains (on land and at sea), the Führer promptly ordered the build of 100 cars. In all, nearly 14,276 Type 166s were built up to 1944, by which time production at the Wolfsburg factory had slowed right down due to damage from heavy bombardment.



Left: The amphibious car was based on the design of the Beetle and boasted an all-wheel drive system



FERDINAND'S FAILED TIGER

THE GERMAN ARMY'S PANZER TANKS WERE ALREADY SOME OF THE BEST ON THE BATTLEFIELD, YET HITLER WANTED BIGGER AND BETTER – AND CHALLENGED PORSCHE TO DELIVER IT

By 1941, Hitler's war industry and economy was in full flow. The Nazis had just emerged victorious from the initial battle of Kiev and the Wehrmacht was only weeks away from declaring war on the USA. Pre-empting this, Hitler ordered a meeting to discuss development of new weaponry, with Ferdinand Porsche and tank manufacturer Henschel in attendance.

The remit for the tank was simple: Hitler needed a machine that was a step up from the current Panzers. They had to be heavily armoured to fend off attack from other tanks, capable of speeds of 40 miles per hour and equipped with a more potent cannon that was dangerous over greater ranges. Hitler wanted the 88mm cannon (originally used as an anti-aircraft weapon in

1933) to be mounted on the vehicle, and that in itself required a bigger tank, as to accommodate it meant a larger turret and a bigger, wider hull. Hitler tasked both Porsche and Henschel with developing separate prototypes in a bid to win the commission for the 'heavy' tank. The vehicle needed to be ready for the German army to use on battlefields by the summer of 1942.

The Henschel tank was designated the Tiger (H) and Porsche's design the Tiger (P). Ferdinand, calling on his title as head of the German Tank Commission, assembled his prototype much more quickly than Henschel, basing his design on the previous VK3001 (P) Leopard. The tank had two air-cooled Porsche Type 101/1 engines mounted in the rear of the vehicle powering two generators, which in turn drove two electric motors that sent final power to the tracks.

However, the genius of Porsche's radical designs on paper could not translate onto the battlefield, and numerous prototypes were dogged with problems such as breakdowns and on-board fires.



Making use of its huge 88mm mounted gun, the carcass of the Tiger (P) tank was turned into the anti-tank Type 130

Above: Though it had genius in its design, the Tiger (P) tank suffered many flaws and was considered unreliable for war

The heavy 45-ton tank also struggled with its power-to-weight ratio, particularly on soft ground.

As such, Henschel and his team eventually won the contract to build the new tanks. Nearly 100 Tiger (P) tanks were already produced by then, though the majority of these stillborn Tiger Program projects were converted into tank destroyers. Armed with huge 88mm mounted gun, with 31 degrees of horizontal movement, it could wipe out an enemy tank long before Porsche's creation itself was within range of fire. These new long-range anti-tank machines were named Type 130 'Ferdinands' by Hitler himself, in recognition of Porsche's work.



Images: Taken from 'Professor Porsche's Wars', published by Pen and Sword Books; Getty

Porsche's products were heavily used in the field by the empire, most notably his huge M 17 tug, which famously carried Skoda M 11 305mm mortars. Dubbed 'Goliath' because of its size, the M 17 weighed ten tons and had wheel diameters of 57.5 inches. The wheels were also ingeniously cleated, providing the tug with traction to give it a top speed of nine miles per hour even in muddy terrain.

Another key wartime development from Porsche was the land train. Major Ottokar Landwehr demanded a train be built that could tackle the perilous roads of Bosnia and Herzegovina. It needed to be able to negotiate sharp turns and cross dilapidated bridges, tackle ascents and descents of up to 23 per cent incline and even go back on its own tracks if needed. This was a tough job, but Porsche nevertheless took on the task.

He and his engineering partner Karl Sackward implemented big power (120 brake horsepower) from a six-cylinder engine. He also incorporated Mixte technology previously used by Porsche on cars. This ensured power was transferred, via chassis-mounted motors and electrical cables, to every alternate carriage of the train. Braking was taken care of by pneumatic hoses between trailers, and control of the carriages was adhered to by gearing that kept them on track. A steering gear and controls were also fitted to the rear of the land train, meaning the driver could switch ends and drive the train in what was effectively reverse. Later B-train developments could also be turned into rail-based train vehicles, while bigger C-trains were dubbed 'generator' cars, capable of shifting huge artillery.

Porsche's Great War efforts didn't end there. Keenly interested in aviation, it was his four-cylinder engine that found itself powering a military-commissioned airship, named the

Ferdinand Porsche was known to always test-drive his creations, even during World War II



INSIDE THE TIGER (P)

THE FULL BUILD SPEC OF FERDINAND'S FAILED TANK

HULL AND TURRET ARMOUR

The hull was protected by 200mm-thick armour at the front, with the sides being 80mm thick and the rear 20mm. The turret, mounted ahead of the hull, was 100mm at the front, with 80mm thickness all round.

ARMING THE TIGER (P)

The tank was armed with a mounted 7.5cm KwK 42 L/70 with a rate of fire of 13.04 rounds per minute.

ON-BOARD CREW

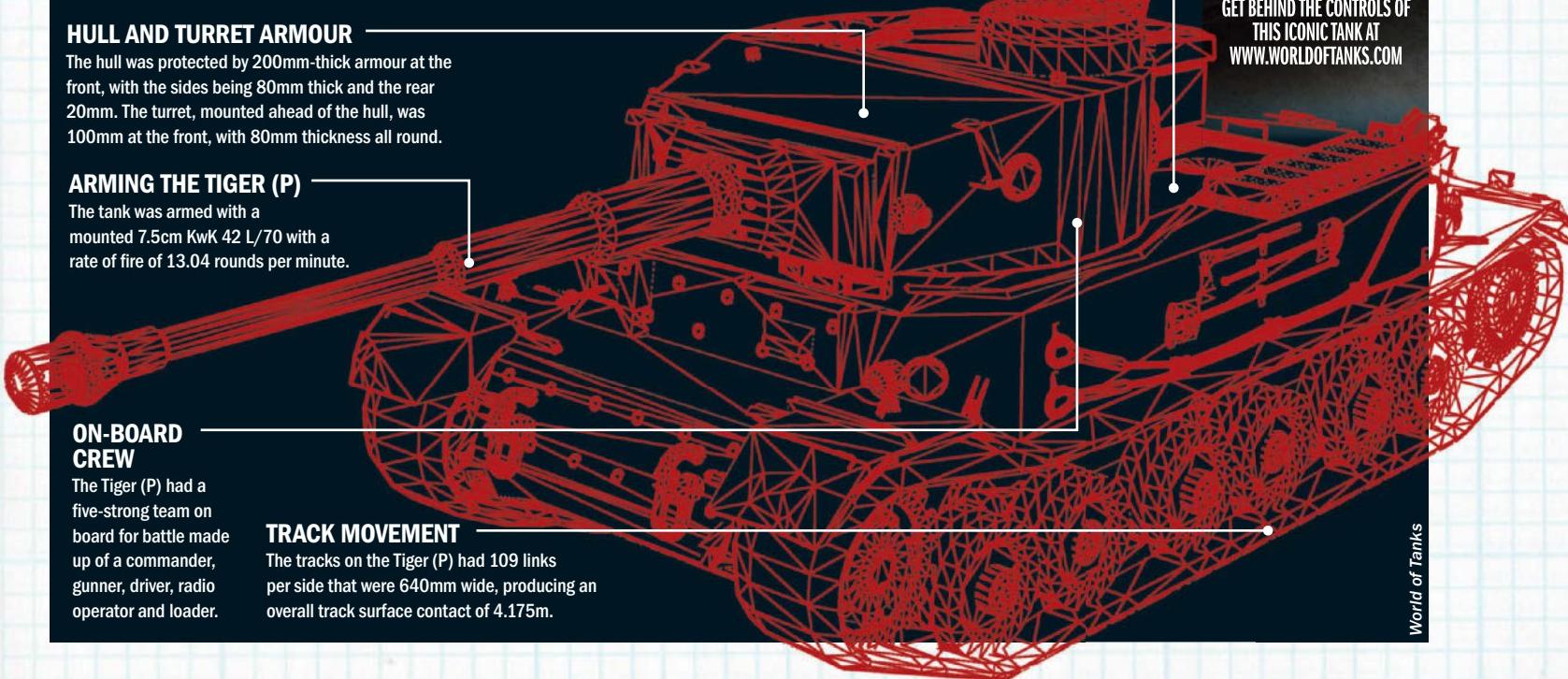
The Tiger (P) had a five-strong team on board for battle made up of a commander, gunner, driver, radio operator and loader.

HEAVY TANK MOBILITY

With a 550hp engine, the Tiger (P) could achieve a top speed of almost 22mph. The turret's traverse speed was some 23 degrees per second.



GET BEHIND THE CONTROLS OF THIS ICONIC TANK AT WWW.WORLDOFTANKS.COM



"THE ROCKET WAS A PULSEJET-POWERED MID-WING UNMANNED AIRCRAFT THAT HAD A PAYLOAD OF A ONE-TON EXPLOSIVE CHARGE"

The flying bomb was big business for Volkswagen, accounting for approximately one third of its revenue in 1943

BUILDING THE V-1 TERROR

PORSCHE'S ENGINEERING SKILLS WERE DEPLOYED TO THE SKIES FOR THE 1944 'VENGEANCE' WEAPON

Brits may have been celebrating the end of the Blitz by 1944, but the Luftwaffe weren't quite finished yet, unleashing their secret 'buzz bomb' rocket designed to turn London to dust.

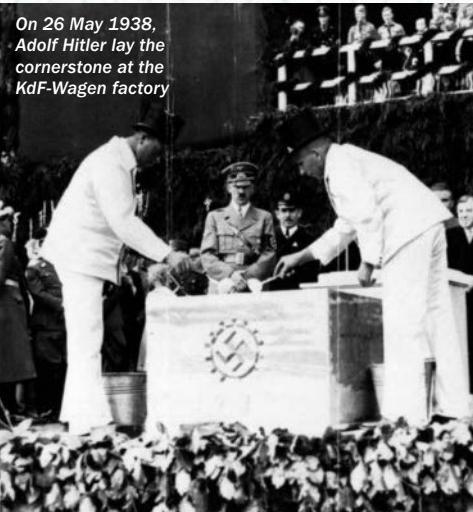
So called a 'V-1' by Nazi propaganda chief Joseph Goebbels (where the 'v' stood for vengeance), the rocket was a pulsejet-powered mid-wing unmanned aircraft that had a payload of a one-ton explosive charge. The plane travelled at up to 430 miles per hour, making it hard to shoot down, and it could travel 150-200 miles from its steam-catapult launch.

Despite the archaic nature of the V-1's brief (the idea of a pulsejet engine dated back to 1908, while an autopilot was considered World War I technology), it wasn't its design that caused problems for the SS, but

where it was built. At KdF City, production of V-1 rockets was thwarted as the plant faced incessant bombing from the Allies. This prompted Porsche to look for a suitable new home for the V-1 to be built, and the result was an underground haven at Nordhausen. In March 1944, Ferdinand spoke with SS chief Heinrich Himmler about the need for a labour force to help dig tunnels and prepare the V-1s, which was granted to the tune of 3,500 prisoners of war.

With a new base and a fresh workforce, production of the V-1 quickly resumed, though Allied bombardment of the French beaches meant that many of the launch stations for the V-1 were ruined. Porsche was then charged with building a V-1 with a wider range that was capable of travelling at 500 miles per hour.

Porsche and his engineers overcame this problem by building a turbocharged jet engine called the Type 300. However, a Type 300 never officially took to the skies as VE Day promptly ensured the war was terminated.



On 26 May 1938, Adolf Hitler lay the cornerstone at the KdF-Wagen factory



At the German Press ball in 1939, Ferdinand Porsche presents the tombola prize: a Volkswagen

Parseval, and Austro Daimler (who Porsche now worked for) were also responsible for the designing and building of the tubular frame of the 160-foot ship's control car. Various other Porsche four- and six-cylinder engines, with a Desaxe cylinder placement, found their way into various aircraft during World War I and beyond.

By the end of the war in 1918, Ferdinand had well and truly established himself as a leading engineer. This garnered interest from several leaders around Europe, despite Ferdinand founding his own company – Porsche – in 1931 with son Ferry.

One of those interested parties was Stalin, who wanted to significantly boost the industrial capabilities of the Soviet Union. As such, Soviet representatives visited Porsche at his Stuttgart headquarters and invited him out to visit Stalingrad, to meet the man himself. There, Stalin offered Porsche a job as general director of development of the Soviet auto industry. It was a role that Ferdinand Porsche took his time to consider, before eventually declining on the grounds that he couldn't speak Russian.

However, it was another eventual dictator that Ferdinand Porsche would acquaint himself with, and the first meeting between the two would come in 1933.

German Chancellor Adolf Hitler promoted an interest in motor sports at the opening of the Berlin Show in 1933, and Porsche promptly wrote to him complimenting such a stance. They met shortly after, the main topic

of conversation being the Auto Union's new P Wagen. Hitler liked the designs for the P Wagen race car and sanctioned its build. The car went on to race successfully from 1934-37.

Part of Hitler's vision for his new Germany was to build an affordable motor vehicle for the population, and he tasked the entire German automotive industry with creating it. Porsche submitted his design in 1934 and, in 1935, was awarded the contract by an impressed Hitler. In fact, the Führer was so pleased that he wanted to name the Wolfsburg factory where the car was to be built the 'Porsche Plant', but Ferdinand rejected the offer and the name was changed to the Volkswagen Plant ('Volkswagen' meaning 'people's car').

Porsche's design was simple by nature, which is exactly what Hitler wanted, as it was

"PART OF HITLER'S VISION FOR HIS NEW GERMANY WAS TO BUILD AN AFFORDABLE MOTOR VEHICLE FOR THE POPULATION, AND HE TASKED THE ENTIRE GERMAN AUTOMOTIVE INDUSTRY WITH CREATING IT"

to be the car for the working man. The KdF-Wagen, as it was known at first – which stood for Kraft durch Freude, or ‘strength through joy’ – was available for Germans to buy by saving up stamps for it. Only a few KdF-Wagens were sold before the outbreak of World War II, when the attentions of Porsche and his engineers were needed elsewhere. The car went back into production afterwards though, when it became colloquially known as the Kaefer, or ‘Beetle’. This in turn gave birth to the automotive legend we know today.

With the ascendency of European tensions transcending into war thanks to Germany’s unprovoked attack on Poland in 1939, the huge purpose-built and Nazi Party-funded Volkswagen manufacturing plant in Wolfsburg (coined KdF City by Hitler in 1938) was quickly turned into a natural base for the building of military vehicles. Ferdinand was to be primarily based here for the Third Reich’s war effort, appointed as head of the German Tank Commission.

The workforce Porsche used to implement his designs were prisoners of war, though these were often severely malnourished and Ferdinand was known to write to Hitler asking that the prisoners be better fed. Hitler agreed to these requests until the last two years of the war, sending orders to feed those that “look like they could work hard.”

Much like in World War I, Ferdinand’s engineering nous was repeatedly called upon for military initiatives on both land and in the air. However, World War II would see Porsche excel in the water too, thanks to the invention of his famous Schwimmwagen. Essentially designed from a Beetle chassis, these amphibious vehicles were used all over Europe to patrol seized territories, and were actually meant to be part of an offensive across the Channel to Britain. Other notable Porsche builds during World War II included a succession of tanks, anti-tank vehicles and even the V-1 rocket.

Right up until the very last days of the war, Ferdinand Porsche was hard at work, devising an improved V-1 rocket that could boast a further range and travel at speeds so fast that Britain’s anti-aircraft machinery couldn’t keep up with it. This was despite the fact that, with the updated V-1’s design remit being cheap and disposable, Porsche knew the situation for both Hitler and the Wehrmacht was by now a desperate one.

Below: In May 1943, Hitler watches a wire-controlled scale model of one of Porsche’s new concepts, the Maus

Images: Taken from 'Professor Porsche's Wars', published by Pen and Sword Books; Getty, World of Tanks



POST-WAR PORSCHE

WITH THE WAR OVER, FERDINAND TURNED TO RACING, CREATING THE LEGACY FOR WHICH HE IS KNOWN TODAY

The bombing of the Porsche factory in 1944 proved the final straw for Ferdinand, who returned to Zell Am See, Austria, with his family in tow. By the time the Third Reich had fallen to its knees, Porsche was under house arrest and, on accepting an invite from the French military to visit Peugeot with a view to designing a Volkswagen for France, was promptly arrested as a war criminal instead.

It eventually took some \$62,000 to secure his freedom, raised in a deal by his son Ferry Porsche and Italian racing team Cisitalia in September 1947. Ferdinand later cleared his name in a French war crimes court, though the \$62,000 release bond was never refunded.

Ferry and Ferdinand turned their attentions to building sports cars in the late 1940s, with Ferry going on to craft the 356 and then, in 1963, the legendary 911 for which the company is best known. Ferdinand died in Stuttgart in 1951, aged 74.



Ferdinand with the
Porsche 356, the first
car sold under the
Porsche name

Great Battles

THE KURSK SALIENT, SOVIET UNION, 5-13 JULY, 1943

WORDS WILL LAWRENCE

KURSK

Soviet T-34s roll into battle at
Kursk with infantry in support

As the invasion of the Soviet Union stalled, two mechanised heavyweights came face to face in the largest clash of armour the world has ever seen

The last major German offensive on the Eastern Front, 1943's Operation Citadel saw Hitler launch a colossal attack on the Kursk salient, or bulge. It was a move that he believed would provide a victory so bright it would "shine like a beacon around the world." This was a battle of the elite, with both German and Soviet armies near their apex in terms of skill and weaponry, hardened by two years of unrelenting warfare.

The Germans, though depleted in manpower, were, for the first time since the invasion of the Soviet Union in 1941, fielding qualitative superiority in terms of armour with the formidable Tiger I tanks and new Panthers. These outstripped the Soviet T-34 Model 43s, which had in the intervening years, with

their sloped armour and 76.2mm gun, proved masters of the battlefield.

The Red Army, meanwhile, was a very different beast from that which had faced the German invasion during Operation Barbarossa two years earlier. At the beginning of 1943, more than 16 million men were under arms, supported by a vast number of artillery pieces. Stalin claimed that "artillery is the god of war," and by 1943, the Red Army boasted the largest and most effective artillery divisions in the world. It also had somewhere approaching 10,000 tanks.

At Kursk, these two heavily mechanised forces came together in an enclosed theatre of operations, like two mighty pugilists meeting for a final championship bout. The result was a watershed. "Stalingrad was the end of the

beginning," said Winston Churchill, "but the Battle of Kursk was the beginning of the end."

The German plan was to launch a double envelopment against the Kursk salient using Army Group Centre in the north, specifically Colonel-General Model's Ninth Army, while Army Group South battered the southern section with Army Detachment Kempf and Colonel-General Hoth's formidable Fourth Panzer Army. This was an awe-inspiring demonstration of German strength, with 2,700 tanks and assault guns taking to the field.

For Stalin and his senior army commanders, Marshals Zhukov and Vasilevsky, the plan was to launch a massive offensive by first wearing down the mobile German forces in a battle-slog around the Kursk sector. They would use



Soviet soldiers wait as a T-34 crosses a trench

"IN FACT, THE GERMAN HIGH COMMAND WAS USING SIMILAR TACTICS TO THOSE EMPLOYED BY MONTGOMERY AT EL ALAMEIN"

three Fronts (the Soviet equivalent of an Army Group) – Central Front, Voronezh Front and the reserve Steppe Front – to grind down German mechanised forces and thereby leave their territories vulnerable to huge counter offensives.

In his bid to snare the German armour, Stalin ordered the transformation of the region into what historian and Kursk expert Dennis E Showalter believes to be “the most formidable large-scale defensive system in the history of warfare”: a triple-ringed matrix absorbing almost 1 million men, 20,000 guns and mortars, 300 rocket launchers and 3,300 tanks. Russian engineers uncoiled more than 500 miles of barbed wire and lay almost 650,000 mines. The Germans’ only chance, says Showalter, was the might of the steel-headed sledgehammer they eventually swung in July.

That blow came on 5 July, after several days of preliminaries involving the German and Soviet air forces and the roar of countless heavy guns. Tank armadas were suddenly on the move, with the Germans committing squadrons of 100 and in some cases 200 machines or more, with a score of Tiger Is and Ferdinand assault guns in the vanguard. Groups of 50 or so medium tanks came next and then floods of infantry, protected by this armoured screen, moved in behind.

These German armoured wedges were known as ‘Panzerkeil’ and, according to the late historian Alan Clark, amount to a rejection of the traditional principles of the panzer army. In fact, the German high command was using similar tactics to those employed by Montgomery at El Alamein, with the difference here that the defenders’ armour was at numerical parity with the attackers’, or was indeed greater, and their defensive organisation meant that many of their tanks were held in reserve. This proved decisive during the mighty clash at Prokhorovka.

As 5 July unfolded, Colonel-General Model in the north committed more than 500 armoured vehicles from his Ninth Army to the attack in a series of staggered bursts, but so violent was the Soviet resistance that about half of these were out of action by the day’s end. Part of the problem stemmed from the committing of both battalions of the Porsche-built Ferdinands to the attack. These were formidable machines, also known as ‘elephants’, were designed for tank-busting and the destruction of large anti-tank guns. Their 200mm-thick armour provided them with ample protection from static gun positions. Their enormous 88mm cannons, meanwhile, picked off Russian T-34s before they even had chance to come within range.

However, the Ferdinands became separated from the lighter tanks and infantry they needed for close-range support. With their static hulls and lack of machine guns, they proved sitting ducks for Soviet infantry units, who boarded them while they were on the move and squirted flamethrowers over the engine ventilation slats. The Ferdinands, however, ploughed through the first line of Soviet defences, allowing the infantry to eventually follow them into the breach, but more than half these beasts of war were lost.

The morning of 5 July also saw the Fourth Panzer Army launch its main offensive thrust in the south, moving along a 30-mile front. According to Kursk expert Mark Healey, 700 tanks and assault guns smashed their huge metal fist into the face of the Soviet Sixth Guards Army on the Voronezh Front, but the Russian defences were so tightly entrenched that the German attack stalled. Eventually, the Luftwaffe’s aerial superiority began to take effect and the Fourth Panzer managed to split the Sixth Guards Army in two.

The fighting in both the north and south of the salient was ferocious, and within 12 hours both sides were feeding the fires that raged across the battle for Kursk. Swathes of ground-attack aircraft strafed the battlefields. The armour

“THEY PROVED SITTING DUCKS FOR SOVIET INFANTRY UNITS, WHO BOARDED THEM WHILE THEY WERE ON THE MOVE AND SQUIRTED FLAMETHROWERS OVER THE ENGINE VENTILATION SLATS”

German heavy armour crosses a Soviet defensive ditch near Belgorod



continued to mass and move “on a scale unlike anything seen elsewhere in the war,” according to the eminent historian John Erickson.

The Soviet tank armies responded to the German assault by moving up into their primary defensive positions and somewhere approaching 7,000 tanks were steadily drawn into this immense clash of steel, leaving an ever-growing number of dying hulls smoking on the battlefields. A Russian communiqué claimed that on the first day of battle, 586 German panzers were destroyed or disabled.

The second day of Citadel, 6 July, was heavily overcast and rain hampered both sides throughout. Along the northern sections of the Kursk salient, the Soviets launched a dawn counterattack with General Rokossovsky’s Central Front enjoying temporary success, until a force of 250 panzers with infantry moving in its wake halted them in their tracks. Throughout the day, Central Front and the Ninth Army were locked in perpetual struggle.

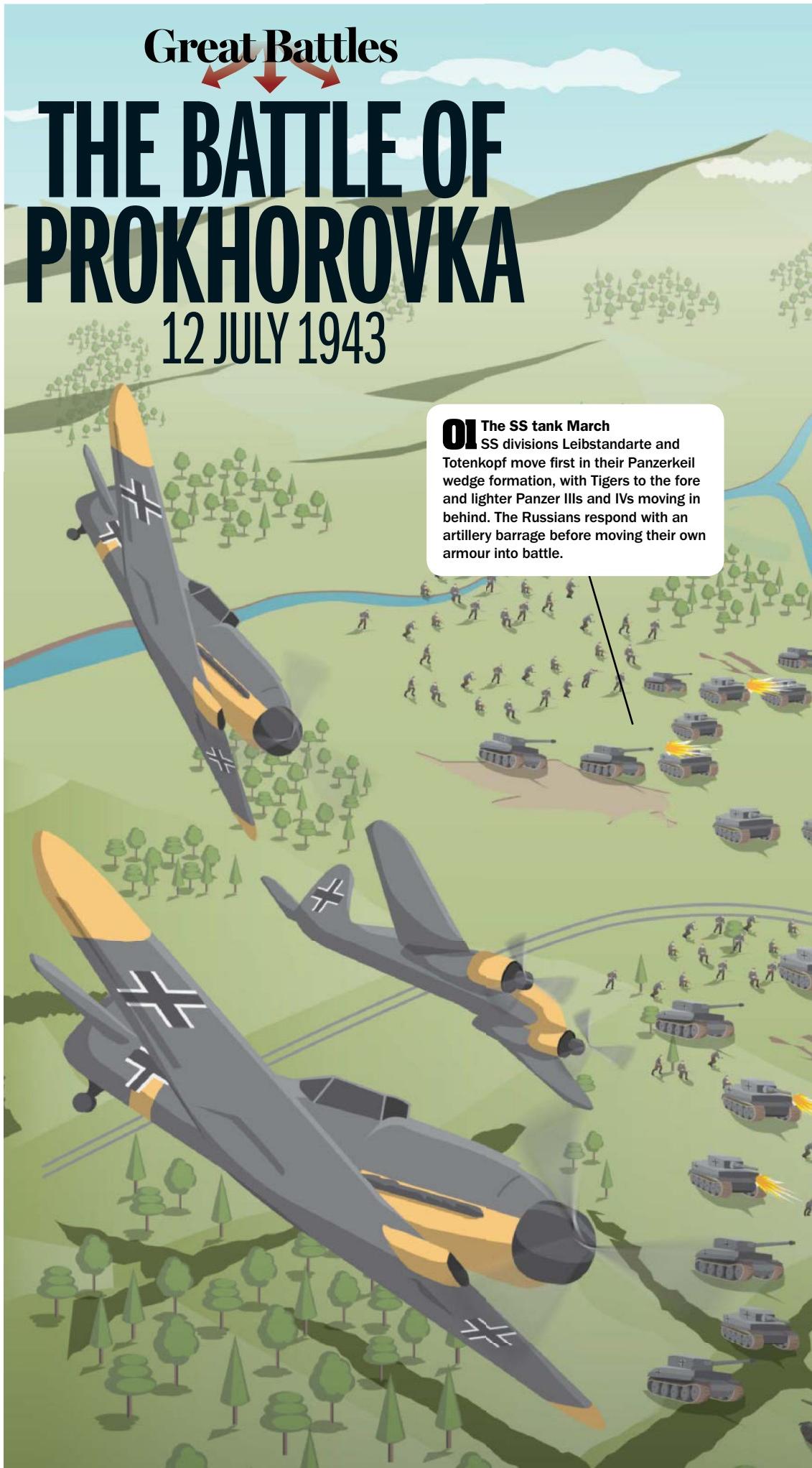
The German offensive rolled on, with Model aiming for the village of Olkhovatka as a prime strategic objective. This high ground provided control over the eastern, southern and western section of his field of operations. The Soviets had already identified this region as strategically vital, and in the weeks running up to Citadel’s launch, had transformed it into one of the strongest sections of the defensive belt. The German Panzerkeil, with the Tigers to the fore, thrust ahead, and by noon on 6 July the Germans had no fewer than 1,000 tanks committed to a six-mile front between the villages of Soborovka and Ponyri.

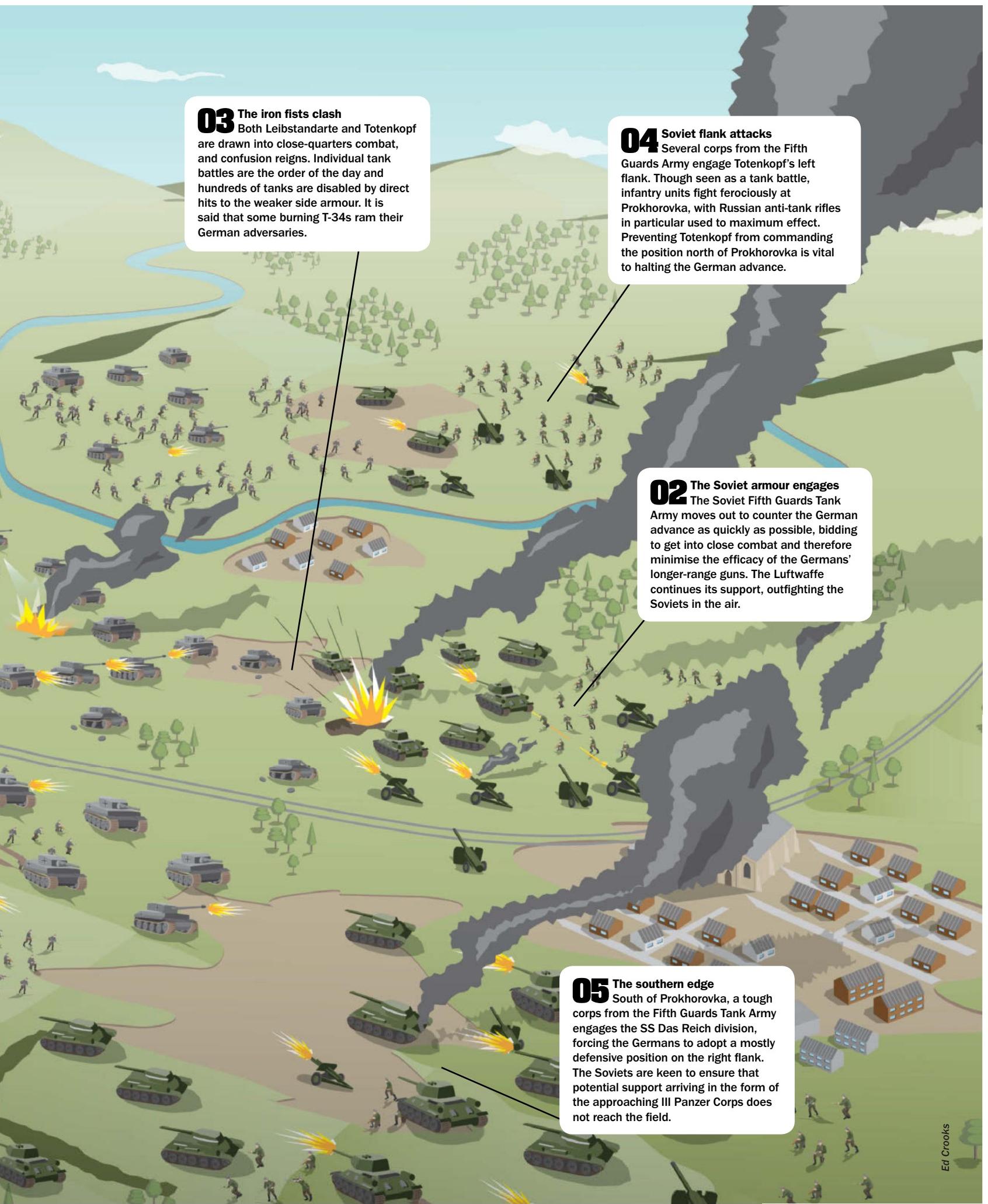
The Russian defences again proved too strong. Time and time again, Model’s Panzer Corps ran into trouble. Unperturbed, he tried again on 7 and 8 July, redeploying huge swathes of aircraft in a bid to penetrate the Soviet resistance. The Soviets were just too well dug in, however, and the German attack ground to a halt once more. “The wrack of shattered panzers marking Ninth Army’s advance,” writes Healey, bear “mute testament to fact that the momentum of Model’s offensive was already beginning to decay.”

Meanwhile, along the southern stretch of the Kursk salient, the second day of Citadel’s operations looked promising for the Germans. The elite section of Hoth’s Fourth Panzer Army, II SS Panzer Corps, had already bitten into the first line of Soviet defence and looked set to devour the second line on the morning of 6 July.

General Vatutin, commanding the Voronezh Front, suggested an immediate counterattack, but was swiftly deflected by a senior officer who highlighted the destruction caused by the Tigers’ and Panthers’ large turret guns with their far superior range. Digging in their T-34s and preparing a wall of defensive fire would serve them better, he argued.

“THE SOVIET DEFENCES AGAIN PROVED TOO STRONG. TIME AND TIME AGAIN, MODEL’S PANZER CORPS RAN INTO TROUBLE”







Above: Soviet artillery took a heavy toll on German armour at Kursk

Still, with help from the Luftwaffe, the German armour rammed through the Russian defence and by the end of 6 July, the SS Panzer Corps was wreaking havoc amid the second Soviet defensive line. The following day was cold and the two sides fought in the descending mist, with the Germans pushing steadily on towards the small town of Oboyan, which defended Kursk from the south.

Early in the morning on 7 July, 400 panzers supported by armoured infantry and airpower crashed onto the First Tank Army of the Voronezh Front, which wavered under the onslaught. By 10 July, members of Hoth's XLVIII Panzer Corps seized Hill 244.8, which stood as the most northerly point taken by the Germans in their bid to reach Kursk. SS Panzer Corps, meanwhile, fought a path through the Soviet defensive line

and regrouped to direct a major assault against Prokhorovka, which, if successful, looked set to smash Soviet resistance in the south.

Back on the northern face of the salient, Model continued his bid to take the village of Ponyri and fierce hand-to-hand fighting erupted, earning Ponyri the name of 'Stalingrad of the Kursk'. The two sides fought to a bitter standstill. On the night of 10 July, Model committed his last reserves to the fray, and although by 12 July his divisions held most of the village, the Russian defence was too robust and the Ninth Army couldn't effect a full breakthrough. When the Germans received intelligence suggesting a major Soviet offensive was set to launch against the Orel bulge, Army Group Centre pulled sections of the Ninth Army away from the action and Model's attack halted.

Come the night of 11 July, and although the Germans were eroding the Soviet position in the south, Stalin and his generals couldn't fail to feel confident. Model's position, hemmed in at Ponyri, left them free to move their armoured reserve, the Fifth Guards Tank Army of the Steppe Front, against Hoth's divisions in the salient's southern section.

With Stalin realising that a final battle was set to unfold, the Fifth Guards Tank Army was placed under the command of General Vatutin on the Voronezh Front, a move that led to what is widely regarded as Kursk's defining moment, the mighty tank battle at Prokhorovka.

"All the elements of myth were at hand," Showalter says of this imminent clash of armour. "Prokhorovka offered a head-on, stand-up grapple between the elite troops of the world's best armies on a three-mile front under conditions that left no room for fancy manoeuvres or for air and artillery to make much difference."

The German II SS Panzer Corps, incorporating the panzer grenadier divisions 'Leibstandarte', 'Das Reich' and 'Totenkopf', was pitted against the Fifth Guards Tank Army. These elite troops met as both went on the attack, "an encounter battle in the literal sense, suggesting predators in rut." Other Soviet units also took to the field, including divisions of the Fifth Guards Army, as well as sections of the First Tank Army and Sixth Guards Army.

Colonel-General Hoth of the German Fourth Panzer Army, his armour having penetrated the Russian defensive line, was keen to push on before "a defensive scab could form over the thin membrane exposed in the remaining Russian defences," as Clark writes,

At the same time, divisions from the III Panzer Corps, part of Army Detachment Kempf, were moving northward to join II SS Panzer Corps, provoking the Soviets to engage Hoth's forces post-haste. Aware that the German Tigers and

"THE GREAT BATTLE OF PROKHOLOVKA BEGAN BENEATH LEADEN SKIES, WARM AND HUMID, WHICH UNLEASHED RAIN AND PEELS OF THUNDER AS THE DAY WORE ON"

Panthers had a longer range than their T-34s, the Soviets bid to move into close combat.

They grossly overestimated the quality of German tanks on this battlefield, according to Kursk historian Lloyd Clark, who claims that the Germans fielded no Panthers or Ferdinands at Prokhorovka, and that II SS Panzer Corps had just 15 Tigers – ten with Totenkopf, four with Leibstandarte and just a solitary giant with Das Reich. Other historians disagree.

Whatever the truth, Leibstandarte, Das Reich and Totenkopf moved in to attack and the great Battle of Prokhorovka began beneath leaden skies, warm and humid, which unleashed rain and peels of thunder as the day wore on. The Germans fielded approximately 600 tanks and assault guns, the Russians 900 (though only about a third of these were T-34s). Hostilities erupted early on 12 July and the inferno blazed all day. The Luftwaffe flew sorties overhead, and the Germans maintained air superiority throughout the battle, though this counted for little in the end.

SS divisions Leibstandarte and Totenkopf moved first in wedge formation, their Tigers in the vanguard, stopping to unload their mighty 88mm shells before moving onward. At about 0830, the Soviet lines unleashed a 15-minute artillery barrage before the Fifth Guards Tank

"BEFORE LONG, SCORES OF TANKS WERE CHURNING UP THE BATTLEFIELD IN INDIVIDUAL ENGAGEMENTS"

Army rolled towards the tide of panzers, bidding to get into close-quarters combat.

Before long, scores of tanks were churning up the battlefield in individual engagements. Up close, the tanks' thinner side armour was more easily penetrated. Thick smoke from the blazing hulls drifted across the battlefield, making gunnery all the more troublesome. The SS Panzer Corps maintained the pressure throughout the day and the Germans tried desperately to bring III Panzer Corps from Army Detachment Kempf into play. If these machines could enter the battle, it may well have turned the advantage firmly in the Germans' favour. III Panzer, however, couldn't break through in time and the SS had to fight for Prokhorovka with no further ground support.

Historians talk of a last surge by Leibstandarte and Das Reich aimed at breaking the Soviet lines on the battlefield's western

edge, but Fifth Guards Tank Army's Lieutenant-General Rotmistrov engaged his final reserves and the tanks clashed head-on once more, darkening the sky with smoke and dust. The fierce fighting continued well into the night but the Soviets had done their job – they had stopped the German advance.

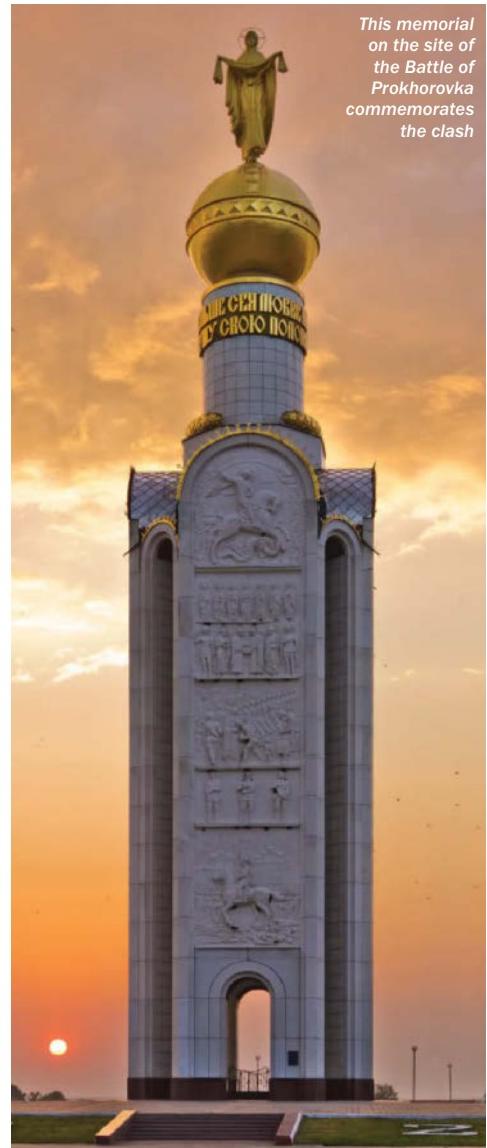
It is estimated that more than half of the Fifth Guards Tank Army's machines were destroyed. "The Waffen SS won a tactical victory on 12 July," writes Showalter. "Prokhorovka was not a Tiger graveyard but a T-34 junkyard. Operationally, however, the palm rests with the Red Army." Prokhorovka bled the German military machine dry. About 300 panzers lay abandoned on the battlefield, and though some may have been salvaged, the field remained in Soviet hands.

Between 13-15 July, SS Panzer Corps continued to make sorties against the Russian defences but in reality it was all over. Hitler called off Operation Citadel on 13 July as the Russians launched a massive offensive, Operation Kutuzov, aimed at Army Group Centre along the Orel salient. The Battle of Kursk ceded the initiative to the Red Army, which then rolled on towards Berlin. For Hitler and the Wehrmacht, defeat was edging ever closer.

Soviet soldiers fire on Germans during the Battle of Kursk



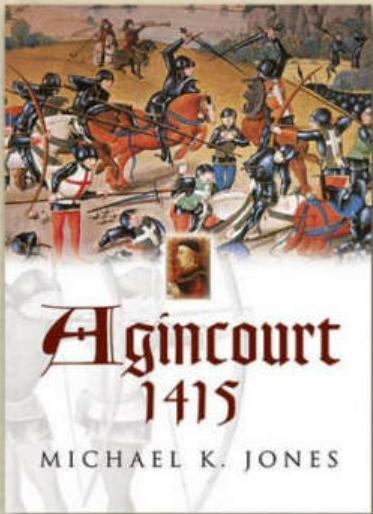
This memorial on the site of the Battle of Prokhorovka commemorates the clash



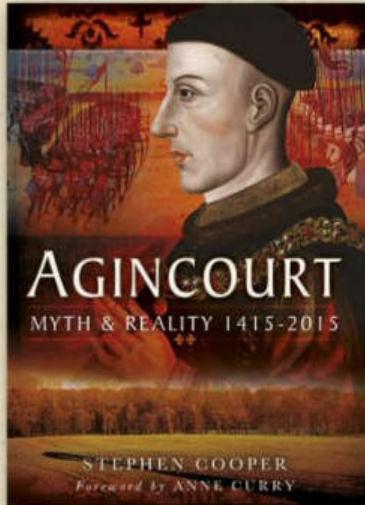
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PEN & SWORD MILITARY TITLES

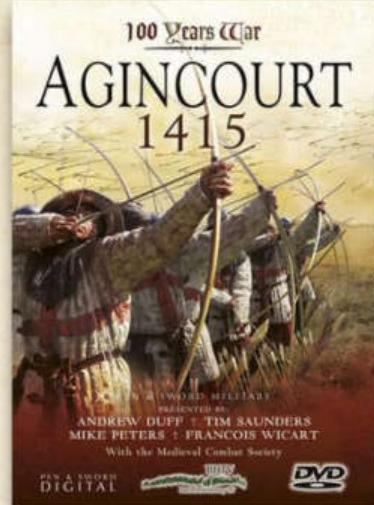
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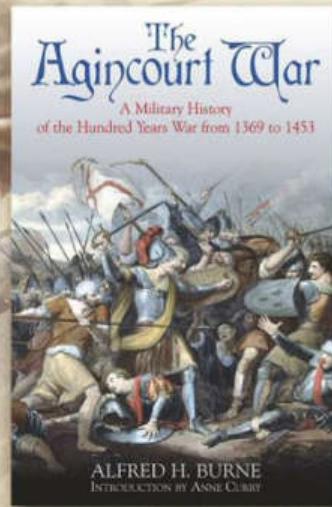
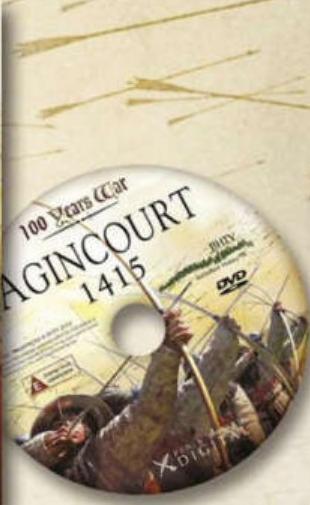
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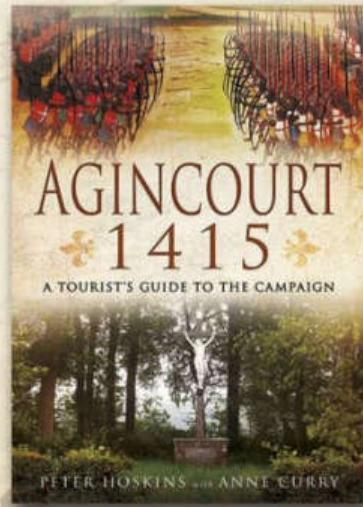
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